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ADDRESSES.

ON THE APPROACHING REVISION OF THE UNITED STATES PHARMACOPŒIA.

Annual Address read before the Kings County Medical Association February 14th, 1890, by the Retiring President.

BY E. R. SQUIBB, M.D.,

OF BROOKLYN, N.Y.

The United States Pharmacopœia, in common with other laws and standards, originated in the necessity for it. It was not created by law, has never had the support of law, nor has it ever asked for it, but was formed upon the experience and example of other countries within and by the medical profession of this country. It originated in the New York County Medical Society, in January, 1817, upon a design and proposition of Dr. Lyman Spalding to prepare for and call together a general convention of delegates from incorporated medical bodies to meet in Washington on January 1st, 1820. This convention met at the time appointed and constructed and published the first Pharmacopœia of the United States of America, then commonly called "The American Pharmacopœia." There had been other local pharmacopœias before this, and probably the first of these was a small book of 32 pages entirely in Latin, for a military hospital of the U. S. Army in 1781, "adapted especially to our present state of need and poverty which we owe to the ferocious cruelty of the enemy, and to a cruel war brought unexpectedly upon our fatherland."

A much larger and better work was however done in "The Pharmacopœia of the Massachusetts Medical Society," published In 1808; and in 1816 the Pharmacopœia of the New York Hospital was published. But these all seemed merely to express the need for a National Pharmacopœia and on the appearance of the U. S. Pharmacopœia of 1820, they all seem to have been abandoned.

Although the U. S. Pharmacopœia never has had any legal authority, it always has had a legal standing in being respected by the courts of law, and it has generally been admitted as standard authority in legal decisions within its scope.

Originating in 1820, it has been regularly revised six times, or once every ten years, since that time, and it has been the good fortune of this writer to have participated in four of the revisions and to have served in three. The original construction of the decennial convention was by delegates not exceeding three in number from all incorporated State Medical Societies, incorporated Medical Colleges, and incorporated Colleges of Physicians and Surgeons throughout the United States, and this construction held good up to the convention of 1850, when for the first time delegates from incorporated Colleges of Pharmacy were invited. This important step of progress amounted to a reformation in the work, and the introduction of this element into the conventions and their committees has so much extended and improved the work in material as well as in detail, that the advent of pharmacy must be regarded as the most important step taken in the sixty years of progress. And, so long as a just balance can be maintained between the elements of medicine and pharmacy, so that each may check the other within its proper perogative, the Pharmacopœia is sure to be progressive and successful. With the medical element in excess it will tend to go back to the original condition of a materia medica catalogue, but with the pharmacy element in excess it will do much worse, for then it will tend to become a trade adjunct. That is, the pharmacy element being more mercantile in its character than medicine, and farther removed from the issues of life and health, is less safe for the true interests of a pharmacopœia. A pharmacopœia, in the true interests of the art of relieving suffering, had much better be a mere catalogue of simple substances than a complex mass of polypharmacy, but should be neither the one nor the other, and need be in no danger of either the one or the other provided a just balance be maintained between the two natural subdivisions of the one inseparable interest.

In the convention of 1850 another step of progress was made by inviting the heads of the Medical Departments of the Army and Navy to participate in the conventions. In the conventions of 1860 and 1870 these departments appeared by one delegate from each; and in that of 1880 the U. S. Marine Hospital Service was added, thus

giving more strength to the medical branch of the interest. If a just balance in ability as well as in the number of delegates can be maintained in these conventions, there can be no great danger to the interest involved, even though a preponderance of the medical branch would be safer. But there has been an unfortunate tendency in the medical profession to neglect or overlook that interest, while the interest of pharmacy is carefully stimulated and kept at its best. Medical delegates are appointed by comparatively few of the organizations appealed to, and the appointments which are made are often made without special selection, and even in a careless perfunctory way, whilst all the pharmaceutical organizations are fully represented by their best men, and their delegates very generally attend and are active in the proceedings. Under these circumstances it seems very desirable that the medical profession should awake to more care of this most important of all its general interests, if it would avoid the danger of losing the interest by having it perverted.

In discussing the proper method of revising a pharmacopœia, it may not be amiss to glance at the plans pursued by other nations. It happens that just now two of the most important pharmacopœias of the world are being revised—those of Germany and Great Britain.

The German Pharmacopœia is in process of revision, and nearly completed by a Commission which consists of 12 physicians, 2 Army surgeons, 6 chemists, 6 pharmacologists and 7 pharmacists or thereabouts, all appointed by the Government, and they are understood to have done the work mainly by subcommittees who report to the general sessions of the Commission; and it is understood that very little of the work,—old or new,—is accepted on other authority than that of actual trial under control of the Commission. As an illustration of what the Commission has provisionally done, the *Pharmaceutische Zeitung*, Vol. 34, No. 101, page 766, Berlin, December 18th, 1889, gives the following notice:

Articles dismissed from the present Pharmacopœia are 77 in number, including 9 Extracts, 11 Tinctures, and 4 Ointments. In this list are two articles, Aloes and Camphor, the dismissal of which will not be understood here.

Of the articles proposed for admission to the new Pharmacopœia eighty-eight have been rejected. Among these rejections we find several that have some popularity here. For example, it will surprise many to find that the following articles have been weighed in the German balance and found wanting: Amylen Hydrate, Apiol, Boroglycerin, Creolin, Eucalyptol, Fluid Extracts of Cascara Sagrada, Castanea, Damiana, Gelsemium, Cotton Root, Grindelia, Hamamelis, Corn Silk, Wild Cherry, Sarsaparilla and Black Haw; also Hypnon, Lanolin, Methacetin, Nitroglycerin, Pyridin, Saccharin, Somnol and Sulphate of Spartein.

The British Pharmacopœia is controlled by a Committee of "The General Council of Medical Education and Registration of the United Kingdom." At the last revision of 1885 the Pharmacopœia Committee consisted of eight members, all in the interest of the medical profession, and the Committee employed Professors Redwood, Bentley and Attfield as Editors of the Pharmacopœia. In December last this Committee reported to the Council that 20,000 copies of the Pharmacopœia of 1885 had been printed, of which only 559 remained, and recommended the printing of 3,000 additional copies. The Committee also recommended that an addendum to the Pharmacopœia of 1885 be prepared by Dr. Attfield, under the direction of the Chairman of the Committee and another member, with the understanding that no new remedies are to be introduced into it except such as have met with general approval. This recommendation was agreed to by the Council, and it is understood that the work is now in progress. This is the way in which the B. P. of 1867 was revised in 1874. There was a new B. P. in 1885, now to have an addendum in 1890.

Through this ultra-conservative policy the British medical profession, by authority of the Government, has jealously guarded that Pharmacopœia from any direct influence of British pharmacy, while indirectly availing itself of the highest pharmaceutical ability by employing some of the best men to do the detail work and calling them editors. That the pharmaceutical interest of Great Britain is justly entitled to a recognized or official share in their Pharmacopœia for the best interests of the Pharmacopœia itself, can hardly be doubted; and yet it cannot be denied that the Pharmacopœia as it stands is of excellent quality, and is, as a standard, more closely followed and more generally used in British medical practice than any national Pharmacopœia.

The Convention for the revision of the U. S. Pharmacopœia of 1880 adopted the following resolutions for calling the Convention of 1890:

Resolved, That the President of this Convention shall, on or about the first day of May, 1889, issue a notice requesting the several incorporated Medical Societies, the incorporated Medical Colleges, the incorporated Colleges of Pharmacy and incorporated Pharmaceutical Societies throughout the United States, and the American Medical Association and the American Pharmaceutical Association, to elect a number of delegates, not exceeding three, and the Surgeon-General of the Army, the Surgeon-General of the Navy, and the Surgeon-General of the Marine Hospital Service, to appoint, each, not exceeding three medical officers, to attend a General Convention for the Revision of the Pharmacopœia of the United States, to be held in Washington, D. C., on the first Wednesday of May, 1890.

Resolved, That the several bodies, as well as the Medical Departments of the Army, Navy and Marine Hospital Service, thus addressed, shall also be requested by the

President to submit the Pharmacopœia to a careful revision, and to transmit the result of their labors, through their delegates, to the Committee of Revision, at least three months before the meeting of the Convention.

Resolved, That the several medical and pharmaceutical bodies shall be further requested to transmit to the President of this Convention the names and residences of their respective delegates, as soon as they shall have been appointed, a list of whom shall be published, under his authority, for the information of the medical public, in the newspapers and medical journals in the month of March, 1889.

Resolved, That in the event of the death, resignation or inability of the President of the Convention to act, these duties shall devolve, successively, in the following order of precedence: Upon the Vice-Presidents, the Secretary, the Assistant Secretary, and the Chairman of the Committee of Revision and Publication of the Pharmacopœia.

This call was published by the President of 1880 in almost, if not quite, all the medical and pharmaceutical journals of the United States, and seems to have awakened much more attention in the pharmaceutical than in the medical bodies to whom it is addressed.

It should be noticed that here, for the first time, the American Medical Association and the American Pharmaceutical Association are requested to elect delegates; and also, for the first time, the three medical departments of the general government are officially requested to appoint delegates. Again, it should be noticed that the several bodies addressed, including the Army, Navy and Marine-Hospital Service, are requested to submit the Pharmacopœia to a careful revision, and to transmit the result of their labors to the Convention of 1890, through their delegates, and as thus provided for the Convention will meet in Washington on May 7.

These Conventions have in the past decided upon the general principles which were to control the revision, and then have appointed Committees of Revision to carry out these principles and do the resulting work in detail; and in view of the very great importance of these Conventions and their Committees of final revision, a more general knowledge of what is to be done by them may be useful.

Each Convention has been organized under the officers and by the rules of the one preceding it, a Committee on Credentials appointed, and when the authorized delegates have been admitted a Nominating Committee is selected by the several delegations, one member from each delegation, including those of the Army, Navy and Marine Hospital Service. This Committee nominates permanent officers of the Convention for the decennial period, and when they are elected the minutes of the last Convention are presented. Next, the report of the Secretary of the Committee of Revision and Publication of the last Pharmacopœia is presented. Next, the preliminary revisions sent in by the different bodies, and any other written communications and contributions, are called for to be referred to the new Committee of Revision and Publication.

The Nominating Committee is then instructed to nominate a new Committee of Revision and Publication, the size of such Committee being decided by the Convention. The last Committee was twenty-five in number.

The last Nominating Committee was also instructed to report a plan for revising and publishing the Pharmacopœia and to make provision for the revision of the Pharmacopœia in the future.

Then the powers and duties of the Committee of Revision were defined and the Committee duly authorized, and this done, the general principles to be followed by the Committee in the new revision were discussed, and either adopted or rejected. This is really the most important part of the work of the Convention, as will be seen by a brief review of the headings as they appear in the Proceedings of the Convention of 1880. First, after due discussion, it was decided that all official titles should be given in both Latin and English, but that the text be in English. Then it was decided that the entire Pharmacopœia present an alphabetical order of titles, classes and titles under classes; that synonyms in common use be given; and that at the end of each article the names of all the preparations into which it entered should be given. Upon these points the experience of ten years has been so favorable that it is hardly likely they will be disturbed or be subjected to much adverse criticism.

The directions for the description of crude drugs seem also to have been sufficient and satisfactory in the main, but in a few instances they do not seem to have been fully carried out by the Committee. This point may lead to discussion in the Committee, but probably not in the Convention.

The directions for the description of chemicals have of late excited much important discussion. It is directed that Opium and Cinchona shall have detailed processes of assay for the alkaloids, and that the minimum percentage of total alkaloids required be given under Cinchona, and the minimum and maximum of morphine in Opium be prescribed. No fault has been found with these directions, but it has often been claimed with much force, that now processes of assay should be directed for all the important crude drugs, even including those which have no definite, separable, active principles. This claim seems to be an outgrowth of experience obtained by the leading step taken in regard to Cinchona and Opium, but this is certainly not the case, for no one who has had much experience with Cinchona and Opium assays can have escaped the difficulties and uncertainties of these. The assaying of crude drugs for their active principles seems an easy matter to those who only read and write upon the subject. But those who attempt to practice the processes

soon get a very different impression, for there is really nothing more precarious and uncertain than these assays in general hands with but a small experience in such work. Assay processes might perhaps be wisely directed for a few additional drugs such as Aconite, Belladonna, Conium, Hyoscyamus, Ipecacuanha, Jalap, Nux Vomica, Scammony and Veratrum Viride.

Pharmacopœial processes of assay will be successful or unsuccessful in proportion to their character. If they aim at a high degree of accuracy and precision they must, necessarily, be elaborate and complex to a degree that places them beyond the reach of general pharmaceutical ability. But if they aim at only the very moderate degree of accuracy, such as satisfies the careful manufacturer in the selection of materials, rough processes of approximate assay may be found that are sufficiently easy of application to be successfully applied to pharmaceutical ability and usage through the authority of the Pharmacopœia. While most of these rough and ready processes are secreted in the hands of manufacturers, yet enough of them are published to give the Pharmacopœia opportunities of selection in these, and in the trials for selection similar processes for all would be naturally reached. Including Cinchona and Opium eleven drugs have been named which might have processes of assay given in the Pharmacopœia, and if high degrees of accuracy be not aimed at, a moderate amount of work in the selection of proper menstrua would enable the Pharmacopœia to apply the shaking out process to all these articles with results sufficiently close for the present scope of the Pharmacopœia, and sufficient to prevent the Pharmacopœia from depending upon either experts, manufacturers, or commentaries. For example, a simple and easy process for Opium assay, which in hands of ordinarily educated pharmaceutical skill and ability would have a maximum range of probable error of not more than a half of 1 per cent. above or below the truth, might be better adapted to the pharmacopœial usage of the present time, than a critically accurate chemical process with a range of error of a tenth of a per cent.; first, because no two samples of the same lot of Opium, whether moist or in powder, would come within this small range of error; and next, because such a process would require a degree of expert knowledge and skill rarely found in pharmaceutical practice.

Another important consideration not to be overlooked is, that with the exception of Cinchona, Jalap, Opium and Scammony, the drugs named can always be bought by pharmacopœial description and tests, of such quality as to yield preparations of practically uniform therapeutic value. The claim frequently heard that all pharmaceutical preparations from crude drugs should be made or adjusted by assay is so plausible and attractive, as to form a most fertile basis for specious advertising by manufacturers of these preparations, and if the Pharmacopœia could be committed to this or any similar doctrine it would put much money into the pockets of large manufacturers, and just to that extent would divert practical pharmacy from its legitimate channels and proper responsibilities. In the first place, the claim is untrue and unfair, because a very large proportion of important drugs have no separable active principle that can be determined by assay, and therefore their quality cannot be determined by assay, nor can their preparations be adjusted by assay. Out of some ninety officinal drugs in all, there are about thirty-four of the more important ones, which may be fairly represented by Ergot, Rhubarb, Senna, Wild Cherry, Dandelion, Columbo, Gentian, Butternut, Pareira, Cotton Root, Cimicifuga, Buckthorn, Leptandra, Sarsaparilla, Spigelia and Stillingia, which could not be adjusted by any ordinary processes of assay, and which do not need it if they could, because care in buying them by pharmacopœial description and tests, rather than by price, will always easily obtain a uniform good quality, at moderate cost. Again, while a fair degree of accuracy and uniformity in the strength of galenical medicines is most desirable, any strain after a degree of accuracy that is not necessary, nor available if attained, is hurtful by whatever is sacrificed to attain it. In the therapeutic uses of medicines, doses are anything but definite or accurate in quantity. Of the same medicines different individuals require different doses to yield the same effect. And even the same individual requires different quantities at different times and under differing conditions, and the real dose is always that variable quantity that yields the peculiar effect of the agent. How then can the physician avail himself of any degree of critical accuracy beyond that practical uniformity of strength and quality upon which his experience is based, or of any degree of critical accuracy which is beyond the limit of accuracy determined for him by variable individual susceptibility? All that is true and sound on this point is that a practical degree of uniformity is all that can be useful, and that this can be attained by the Pharmacopœia without any such system of elaborate assaying as would tend to throw this important interest of the Pharmacopœia into the hands of experts, or would-be experts. The line of wise action seems not difficult to draw here. If the descriptions and tests of the Pharmacopœia can be improved without carrying them beyond the reach of educated pharmaceutical or medical skill in application, this should be done, applying assay processes only to such drugs as have easily separable active principles. Then, a very few preparations, such as those of Opium, Nux Vomica, and perhaps Cinchona, might wisely have their strength adjusted by these assays. There has never been a time within the forty years' ex-

perience of the writer, when officinal drugs were more accessible to those who would take the trouble to look for them, and be willing to pay for them; and to those who will not take the proper pains, nor pay adequate prices, the Pharmacopœia would continue to appeal in vain, even by the most elaborate system of assays and adjustments, if such a system was practicable.

The Convention of 1880 next specified the chemical formulæ and chemical notation that were to be used throughout, and also directed special chemical processes to be given in detail for officinal chemicals, with the result that these have been, in the main, fairly successful. Some of the processes have not been given in sufficient detail, but such being now known, they will doubtless be amended.

A very important direction, given by the Convention of 1880, after much careful discussion and deliberation, was that "All measures of capacity shall be abandoned and quantities shall be expressed in *parts by weight;* except that in the case of Fluid Extracts, the Committee of Revision and Publication shall have authority to adopt such process or processes as shall seem to it best."

This change has caused some popular dissatisfaction and adverse criticism, and it is not unlikely that in the approaching Convention there will be an effort made to get back to the old weights and measures on the one hand, or to metric weights and measures on the other. The present plan having now been in use for about eight years, there should have accumulated experience enough to enable it to be dispassionately discussed, and if it be so discussed it will doubtless be continued in force. The chief objection to the plan seems to be the weighing of liquids which had hitherto been measured. The writer has looked in vain for any argument against the weighing of liquids. The reason why the practice was changed was that the measuring of liquids was inaccurate beyond what is easily controllable, and beyond what is now admissible in the progress of medicine and pharmacy. No reasonable person doubts this, and no attempt to fairly controvert it has been noticed in any other way than by the mere clamor that weighing liquids is too troublesome, and therefore the less troublesome measuring must be reinstated. No one has ventured to say that the measures accessible in general practice are as fairly accurate or uniform as the weights are; nor that, if the measures were accurate, measuring by them would be as accurate, or anywhere near as accurate as weighing. Every one knows that the adjusting of the level of the liquids to the mark in measuring is never twice the same even in the same hands, and that with double the amount of care and pains in measuring, the weighing is the more accurate. Every one knows, too, that, as measuring must of necessity be continued in use for dispensing and dosing, and is there applied only to dilute liquids, when small errors may be tolerated,—this circumstance limits the weighing of liquids to the actual practice of the Pharmacopœia; and the number of times when, in compounding from the text of the Pharmacopœia, liquids require to be weighed, is small though very important. Those who object to the weighing of liquids simply because it is troublesome and inconvenient, while granting the superior precision of the practice, cannot certainly be of the same class which demands to have preparations adjusted by assay for the sake of precision.

Objections have also been raised against the use of parts by weight, and it is not unlikely that efforts will be made in the Convention to return to arbitrary weights. This, again, would be to lose all the ground gained by eight years' experience in this step of modern progress. The chief reasons for adopting this simple and precise method of expressing relative quantities were, first, that it avoided the two tables of weights and measures which had led to confusion for so many years, and allowed the operator to use any system which he might have at hand, including the metric system; and second, that it did not commit the Pharmacopœia to any definite quantity for its preparations, but allowed the operator to make the quantities that were best adapted to his wants at the time. That is, he might construe the parts by weight to be any system of pounds or ounces he might have, or, he could make each part a half or a quarter ounce, or ten grains or one grain, or a gram, or kilogram, and the result would be always the same. Besides, it was a step towards the metric system, the adoption of which, though distant, must now be considered very sure. To return to the old apothecaries' weights and measures, or to adopt the avoirdupois, would be to lose all that has been gained, and throw the labor on some future Convention of starting anew from the same old point of ten years ago. The reasons for making this change to parts by weight have never been successfully controverted. No one has ever shown that the change did not accomplish the objects intended by it, nor has any one shown that the change involved disadvantages which, either in their nature or degree, overbalanced the advantages. The summing up of all that has been said against the method seems to have been that it was not generally understood sufficiently well to be generally adopted, while it replaced a method that was well understood and successfully practiced, and therefore it was inconvenient and objectionable. Thus stated, these objections seem simply puerile, especially if looked at in connection with the examination papers of the various schools of the country year after year. That any of the students who passed any of these examinations for the last ten years should not know

enough of common elementary arithmetic, to easily substitute parts by weight for any arbitrary system of weights and measures with the tables before them, is incomprehensible. Then it must not be forgotten that the former revision adopted the apothecaries' or 480 grain ounce, and the 456 grain fluidounce, while it was shown that ignorance, stimulated by pecuniary profit, led to the not uncommon use of the 437½ grain ounce and fluidounce, and to this day some of the largest manufacturers in the county graduate their measures by the 437½ grains of distilled water to the fluidounce. Should there be any thought in the Convention of going back to an arbitrary system of weights and measures the avoirdupois table should be adopted, as in the British Pharmacopœia, where the small ounce and fluidounce are used exclusively. Then, in such a change as this it should not be overlooked that most troublesome calculations and equally troublesome fractions would be required to keep the officinal preparations near their present strength.

In concluding these remarks, it may not be useless to offer the force of one single example. It is highly probable that this writer uses the Pharmacopœia in actual practice as much as any other individual in this country, and he has found the weighing of liquids, and the use of parts by weight, not only more accurate, but also much more convenient than the older usage, and he is therefore a strong advocate of the continuance of the plan in the approaching revision.

The last Convention gave wise directions that such preparations as tinctures, wines, etc., in which slight variations are not important in case of a change for uniformity's sake, might be reduced to uniform percentage strength, but that the more active preparations of this class should remain, as nearly as possible, unchanged. The work of the Committee of Revision under these directions has been satisfactory so far as is known.

The direction that temperatures should be expressed in both centigrade and Fahrenheit degrees was very wise, and the practice has been very useful.

The direction that all doses shall be omitted from the Pharmacopœia was but a continuation of the usage in all previous revisions. In every revision there have some efforts been made to have maximum and minimum doses given, as in some other pharmacopœias. This has been advocated, not only as a guide to physicians in the use of both old and new medicines, but also as an important guide to pharmacists in checking mistakes in prescriptions, and in exercising caution against excessive doses. It has also been advocated as tending to increase the usefulness and authority of the Pharmacopœia in courts of law. But the objections which have always prevailed in overbalancing these admitted advantages were, first, that, in any accurate sense, there are no maximum and minimum doses that are not so wide apart as to lose all practical value, and be in danger of misleading. It is generally known that each individual has a different susceptibility to potent agents, and therefore requires a different dose. Next, that different diseases and disorders require different doses; and different conditions of the same disease also require different doses. And, finally, that different authorities differ so much among themselves that from them it would be impossible to adopt a standard range of doses that would be short enough to be of much practical value, while the Pharmacopœia, aiming to be a standard, could not be a standard in this. In short, the only doses that could be wisely stated would be those proper to begin with, imposing on physicians their duty of watching the effects of their agents and increasing their doses until they reach the desired effects or the physiological effects. Undoubtedly physicians are often so trammelled by stated doses as to miss the uses and effects of their agents, and if this be so, and if the above considerations be admitted, then all that the Pharmacopœia could wisely do, would be to give proper, safe doses to begin with in the application of its standard agents. This much would not commit the Pharmacopœia to anything beyond its legitimate scope.

The Convention of 1880 directed a large number of useful tables to be appended to the Pharmacopœia specifying those most desirable, and authorizing the Committee of Revision to add any other tables that might be deemed expedient. The Committee did add a number of very important tables selected with care from various authorities. But three of those directed by the Convention were omitted. One of them, namely, a weight and volume table to facilitate the use of parts by weight and by the metric system, is very important, and would have been very useful. The want of such a table has been supplied by the commentaries on the Pharmacopœia, but just to the extent that this is necessary or useful do the commentaries take the place of the Pharmacopœia. Such a table involves a large amount of careful labor in both construction, and detail work, but it seems to be practicable inasmuch as the commentaries have supplied most of the elements of such a table in detail.

Another table ordered by the Convention and not supplied by the Committee was one of specific gravities of officinal liquids for each degree of temperature between 10° and 25° C. (50° and 77° F.) This would be a very useful table indeed, and one that, so far as this writer knows, is not to be found elsewhere, but it is one that would require much careful labor to make. Specific gravity is perhaps the most important of all the tests of quality of liquids, as it is the most generally applicable, and the main difficulty in the way of its application has always been the

adjusting of the liquids to a single given temperature. Therefore, if a table was carefully constructed giving the equivalent figures for each degree, or each five degrees of ordinary room temperature, specific gravities could be so easily, so quickly and so accurately taken as to very greatly increase the application of this test. Such a table might be constructed in either of three ways. The standard volume of water for comparison might remain constant at 4° C.=39.2° F., or might remain constant at 15.6° C.=60° F., or it might vary with the room temperature at the time of weighing. That is, the volume of water for comparison might always be at the same temperature as the liquid compared. This latter is the true essential idea or principle of specific gravity, but its general use would involve the necessity of either a special bottle with a graduated tubular stopper graduated for each degree, or five degrees of water expansion,—or a troublesome arithmetical calculation,—both very objectionable when the aim is easy, rapid and accurate practice. Apparent specific gravity by either one or both of the fixed standards would be preferable. Throughout continental Europe the standard volume most used is water at 4° C., and this is becoming common in Great Britain and in this country also, but for a true specific gravity by this standard, the liquid compared must be reduced in temperature to the standard 4° C. This is always troublesome, often difficult, and sometimes impracticable, and therefore apparent specific gravities by this standard are common. That is, the standard volume at 4° C. is used, and the temperature at which the same volume of compared liquid is weighed, is given. As a general rule, throughout Great Britain and this country the standard volume used is water at 60° F=15.6° C., but the last Committee of Revision very unwisely, as the writer thinks, adopted a new standard of temperature of 59° F.=15° C., so that now the officinal specific gravities cannot be referred for comparison to any known tables in previous use with perhaps a single exception. If a table had been constructed as directed by the Convention this would have been the less objectionable, because then the new figures could have been easily compared with those of previous usage, and the equivalents be known. The most convenient usage for a pharmacopœial table at the present time would doubtless be to adopt 15.6° C.=60° F. as the standard volume and take this as the basis of a table of apparent specific gravities. That is, let the standard temperatures remain constant, and compare all the other temperatures with this. This method would be almost necessary in this country as almost all the specific gravity bottles in pharmaceutical use here are adjusted with more or less accuracy to 60° F. Then all that would be needed would be to fill and weigh the bottles at any room temperature at which the liquid might be. Then ascertain this temperature and by it refer to the table where, coupled with the apparent specific gravity at this temperature, would be found the true specific gravity at the standard temperature. In constructing such a table the actual specific gravities should not be taken closer together than for each 5° C., because the interval could be more accurately filled in by calculation than by observation. If such a table be not supplied in the next revision there should at least be given, in all cases, an apparent or true specific gravity at 25° C.=77° F., as is now done in the instances of Ether and Alcohol.

A third table ordered by the Convention and not supplied by the Committee, was one comparing the strength of powerful galenical preparations of foreign pharmacopœias used in this country with that of the corresponding preparations of our own. Such a table would be useful, and occasionally important. But such comparisons are of late so infrequently needed and so easily reached, when needed, by a little calculation, that the table has probably not been missed.

Knowing, as this writer does, the enormous labor put upon the last Committee of Revision by the Convention, and the great and numerous difficulties under which this work had to be done, it is not to be wondered at that some of the less important matters were left out. The next Committee will, it is hoped, be under much more favorable conditions. Thanks to the wisdom by which a high price was put upon the Pharmacopœia, there is now money enough in hand to begin the new revision and carry it forward for some time without delay. The last Committee had no money, and although the Convention authorized the employment of experts for the detail work, it did not provide any money to pay such experts, so that it was only when the work was so nearly done that the copyright could be sold that money became available, and then experts were not needed. All the work had to be allotted to the members of the Committee, and it was done by them, busy men as they were and are, without any remuneration of any kind. The Chairman of the Committee, however, had far the most laborious position, and a position that no future Convention should ever ask a Chairman to fill without liberal compensation for his ability, time and work. These Conventions must have Chairmen of exceptional ability and indefatigable industry, who can give a large portion of their time to the work, and such a Chairman who has served once has, to the Convention, double the value of any new man whose peculiar and rare qualifications for the work are unknown and untried.

There has been a good deal said in the journals against the high price of the present Pharmacopœia and in favor of a book of low cost, and it

seems to have escaped the attention of the writers, that this was the only way in which money could have been raised then to defray the absolute outlay necessary for a proper revision of a national Pharmacopœia, even when all the individual labor of the revision was volunteered without remuneration by men who could ill afford it; and the profit upon the sale of the Pharmacopœia must be, in the future, the only means of paying for the labor put upon it. Besides, it must be borne well in mind that the amount and quality of the labor put upon it will be sure to govern the demand for it, and that the time has gone by when the kind and quality of labor that will make a salable book can be had without being paid for. There are several private interests which would be willing to take the work and pay all expenses upon it, and then give the book away, if they might have its authority and prestige to use for business advertising purposes, especially if it could be made to lean just a little in the direction of any one of the single special interests; but the number of those who would like to see the Pharmacopœia paid for either wholly or in part, in any such way, must be very few. The price realized for the Pharmacopœia over and above its actual money cost, is in reality the tax which is paid by those who use it, to pay the expenses of the next succeeding revision, and those who demand that it should be sold at or near cost, simply ask that the Convention and its Committee pay their own expenses, besides contributing the time and work. Of course a line must be drawn somewhere, and the experience of the last revision will be very useful in determining the price of the next; but it must always be borne in mind that each revision is more expensive than the last, and that in no revision yet has the expensive part of the work been paid for; and, further, that in all succeeding revisions it must be paid for, if better work is to be had. The only way in which a really good Pharmacopœia, fully up to its time in the quality and quantity of the work put upon it, can be supplied at a low price, is for the Convention to pay the expenses by a tax upon the bodies whose delegates form the Convention. In other nations the governments pay all the expenses, including the expert skill and labor; yet in some of them—Great Britain and France, for example—the book is sold at a high cost for those nations. It is quite probable that now that a small surplus will be handed over toward the beginning of the next revision, and now that the copyright is worth more than ever before, the approaching revision may be kept as good a book and yet be sold at a lower price, especially if the Committee should resolve not to sell the copyright, but instead, to publish the book themselves in case they cannot get a better price for it than heretofore.

By far the most important work of the Convention is the selection of its Committee of Revision and Publication. The Convention first decides of how many this Committee shall consist, and then how it shall be nominated. The last Convention directed that it should consist of 25 members, and be nominated by the Nominating Committee; that is, the Committee raised to nominate permanent officers for the Convention. This Nominating Committee consisted of 38 members, or one from each body represented by delegates present, and one each from the Army, Navy and Marine Hospital Service, the several delegations being called upon to name their members. In regard to these two very important Committees in the approaching Convention the following points are offered for consideration in advance, and for whatever they may be worth:

The Convention of 1880 consisted of about 116 accredited delegates; or, if duplicates and alternates be omitted, 104—69 medical and 35 pharmaceutical. About 80 of these were present, and therefore, the Nominating Committee of 38 was nearly half the Convention. Such a Committee, though very fairly representative, is too large for the best committee work, and the next Committee, if made up in the same way, will probably be still larger.

In the selection of permanent officers for the Convention this Committee might wisely discuss the advantages of having the offices of President of the Convention and Chairman of the Committee of Revision and Publication devolve upon one man, and of attaching a liberal salary to this office of ten years' duration of labor.

The Committee of Revision and Publication must of course select its own plan of work, but it would be entirely competent for the Convention, if it so pleased, to direct that every process and every test, including specific gravities, should be actually tried by expert hands before being accepted for publication; that is, that authorities on these points should not be accepted untried.

Again, it would be competent for the Convention if it chose to do so, now that there will be a moderate amount of money to start on, with every prospect of a sufficiency in the future, to direct that under the guidance and control of the Chairman the detail work should be done by well selected and well paid experts, and be submitted to subcommittees for comment and confirmation, thus reversing the order of work in the last revision, where want of funds rendered such a plan as this impracticable. By some such plan as this every process and every test would have a double security for its accuracy, and would be, in this, a great improvement upon former revisions. Besides, it would very much lighten and simplify the individual labors of the committeemen, and give them more time for the consideration of admissions, rejections and other changes, which require much reading up and careful deliberation.

The recent introduction to the materia medica of synthetic chemical substances, which are either patented or trade-marked, seems to indicate that although the substances are already numerous, they are still to become more numerous and more complex and confusing to the ordinary physician, and that no work of the Pharmacopœia is more important than to protect such physicians against the interested representations of trade in these very lucrative articles, if any of them should be admitted. The question as to their admission and as to how many of them is a most important one for the Committee, and one not to be lightly nor hastily settled. One difficulty in regard to these substances is comparatively new. Their chemical names are long and impracticable. Rational names are not easily, while empirical names are very easily found, and these are trade-marked or patented, and the tendency now is to trade-mark these, rather than to patent them, because patents expire in a definite time, but trade-marks continue to protect indefinitely.

In conclusion, the writer begs to lay all possible emphasis on the grave importance of this work to the medical profession, and to urge the need of sending the best and most conservative men to take active part in this Convention, remembering that inactive delegates, though in a numerical majority, carry little weight in Conventions of active men full of the spirit of mercantile enterprise.

ORIGINAL ARTICLES.

PHYSICAL EDUCATION IN CHILDREN.

Read in the Section of the Diseases of Children at the Fortieth Annual Meeting of the American Medical Association, June, 1889.

BY A. H. P. LEUF, M.D.,

DIRECTOR OF PHYSICAL EDUCATION AT THE UNIVERSITY OF PENNSYLVANIA.

It is my object in this paper only to call attention to the value of physical education in children for the prevention and cure of disease. But before this is done, it is best to consider briefly the physical condition of children.

Bones.—The bones of children are imperfectly formed. Many are semi-cartilaginous, while others consist of different segments held together by intervening cartilage. They are elastic, and full of blood and fat. The periosteum is thicker than in adults, and richly supplied with vessels. The connective tissue of young bone is tender, and hence has not as firm a union with tendons and ligaments as is found in adults. The cartilaginous union of the shafts of bones with their epiphyses makes violent exercise dangerous because it is likely to cause separation.

Muscles.—The muscles of children are in less of a developmental state than bone, though the muscle elements are not as firmly bound together as in adult bodies. Their nutritive supply is very liberal and they are generally surrounded by a liberal layer of fat. They contain a larger proportion of water than those of adults, and therefore are not so firm and hard as the latter.

Blood-vessels.—These are all relatively large in children and liberally supplied to nearly all parts of the body. They are more susceptible to impressions at this time of life than in later years. I mean that it is easier to develop them in childhood than in adult life, for they respond more readily to increased pressure and have a relatively better nutritive supply. Oxygenation of children is also better performed than in adults because the freshly ærated blood has a shorter distance to travel from the heart to the remotest parts of the body.

Nervous System.—While the nervous system is undergoing considerable development in children, it presents quicker reflexes than in adults, probably largely due to the shortness of the peripheral nerves, thus consuming less time in the transmission of the afferent and efferent impulses. But a child's nervous centres are more sensitive to stimuli and irritations, as is shown in their common reflex convulsions and febriculæ almost always readily controlled by the administration of nervous sedatives, notably the bromides. Shortness of limb, entirely aside from the rapid transmission of nervous impulses, is very conducive to the rapidity of movements so noticeable in children.

The Viscera.—The large liver and the relatively small lungs are prominent anatomical features in the child. The stomach and intestines are proportionately large, causing a decided abdominal bulging. The viscera of a child have a softness and vascularity in marked contrast to the same organs in the adult. All in all, children are a much more delicate organisms and require a comparatively greater amount of care.

Digestion.—The inbibition, digestion, and absorption of food in the child consists of a most interesting and important series of phenomena without a thorough understanding and appreciaof which the proper physical education of children at any time is impossible. Too much stress cannot be laid upon this point, and it must always be remembered that no fixed dietary will do for any large number of children.

Growth and Development.—The child is undergoing constant changes of growth and development, all its powers being more active generally than those of adults. The association of its organs are new and more apt to be impressed by external influences than in an older organism. What would produce a moderate effect upon an older organism might be powerful in its influence upon a younger one. Adult organisms undergo but little further development while in children many changes have yet to occur. It

follows that more care must be exercised in the direction of children's exercise than that of grown men and women.

At first sight it does not appear that exercise can have much effect upon the growth of bone, but the facts of experience teach that it is so. The explanation is simple. Young bone is but a connective tissue framework, filled with bone cells, or osteoblasts, and cartilage, and this blends directly with the surrounding periosteum, thus forming a continuous, direct, and intimate fibrous connection of the periosteum and the entire interior of the bone. In the same way can muscles be described as consisting of a connective tissue framework supporting muscle cells and their vessels and nerves. This all pervading connective tissue begins to predominate over the muscle element as it nears the end of the muscle to become modified into the tendon. This tendon loses itself in the periosteum and bone to which it is attached in very much the same way as its other end does in the muscle. Thus a muscle tendon is inserted into the very heart of the bone and not into its superficial layer, as is so commonly and erroneously supposed, and unfortunately too often taught.

From the intimate relations that I have indicated as existing between the connective tissue of bone and muscle and the intervening tendinous structures, it follows that forcible or sustained muscular contractions that pull upon a bone, act upon its deeper parts as well as upon its surface. It also follows that the depth at which the strain is felt in any bone depends upon the severity and duration of the force exerted.

It is a well known law in physiology that increased functional activity of a part causes an increased supply of blood. Suppose now that the child is doing considerable exercise, and we have at once an increased blood supply in its acting muscles and strained bone. If this is kept up a long enough time the increased blood current leads to a higher nutrition of the part—growth—and should the bone be in the developmental state, it will modify its development. As a proof of this effect of exercise upon bone, I will only call attention to the readiness with which anatomists usually distinguish the bones of a male from those of a female because of their larger size and the more decided markings of their ridges for muscular attachment. "This must have been a powerful man," is an expression often enough heard coming from teachers when looking over a skeleton with prominent ridges and tuberosities. In my paper on "Base Ball Pitcher's Arm" I had the opportunity to first call attention to the fact that bone growth in the adult is caused by excessive exercise.[1]

My sole object in being so explicit upon the effect of exercise upon bone is to show that it is a potential agent for doing much good or harm according to its proper or improper application. With this example well in mind, it is hardly necessary to demonstrate the equally potential power of exercise upon all the other parts of the body, when it has been conclusively proven to have so decided an effect upon the nutrition and growth of as hard and unyielding and relatively passive a substance as bone. Now what are the general effects of moderate and violent exercise in health?

Moderate Exercise in Health.—When judiciously taken, moderate exercise, in ordinary health, increases the nutrition of the body by increasing the heart's action, expanding the blood-vessels, increasing the secretions and excretions, and subsequently inducing tranquil and refreshing sleep. Besides this, it increases the vigor of the respirations, and thus the oxygenation of the blood. The body is pervaded by a healthy glow that remains for several hours, and is followed by a feeling of added strength without any subsequent reaction.

Violent Exercise in Health.—By violent exercise I mean any physical work that is felt as a decided task. All such is sure to induce local congestion at the seat of strain, and if persisted in will cause inflammation and hypertrophy. None of the organs subjected to these strains escape this inevitable result. In the young it may even cause epiphyseal separations, tearing of the periosteum, and rupture of muscle. It follows from this that moderate exercise is better adapted for general use among children than the more active and dangerous variety. For some purposes, though, the latter is more desirable, but it must be used with caution.

Therapy of the Exercise of Children.—Under this head I wish simply to mention some of the circumstances under which it is possible to benefit children either by exercise instead of, or in conjunction with, other means. Of these conditions some of the most important and prominent are *spinal curvatures* not dependent upon osseous disease. Several plans for the relief of this class of cases are now in vogue, but all seem to me more or less seriously defective. It is very generally, and I believe justly, supposed that these curvatures result from muscular weakness. Yet one plan is to treat them by a fixed plaster jacket, or by metallic braces. The defect of this treatment is that, while it may hold the column straight, it does not strengthen the weak muscles which should be able to hold the column in its proper position. Another method is to prescribe certain exercises that will develop certain muscles until they are strong enough to obliterate the curves by their contraction. This plan is also defective in that it only develops certain muscles, while others equally as important are overlooked. Sufficient success may, and often does, result

[1] Medical News, July 16, 1887.

from such treatment in so far as it pleases the patient by evident improvement. But the physician's work does not stop at this point. His business is to permanently restore abnormal conditions to a normal state. Special development of certain muscles does not do this, for by following such a plan one simply replaces one deformity by another. No treatment of deformities by physical exercise is devoid of serious error that does not affect the symmetrical development of the body.

For instance, in a dextral dorsal curvature due to muscular feebleness, the fashionable physical culture treatment now in vogue would compel the daily exercising of the muscles of the left side of the chest for the purpose of pulling out the ribs and reducing the concavity of the spine of that side. So far the utility and correctness of this treatment cannot be assailed. But it practically stops at this point, or with a few additional exercises, causing a bending of the trunk so as to antagonize the objectionable curve. The method is defective by omission. Of what avail is it to have a straight spinal column with muscles on one side much stronger than those on the other? A muscular deformity succeeds one that was bony. This is not all, for in course of time the stronger side predominates and the curve returns, but it is the reverse of what it was in the first instance. What is absolutely requisite to a permanent cure is general exercise for both sides, and a few supplementary exercises to help reduce the deformity without unnecessary delay. These may be of the calisthenic variety, or by means of dumb-bells, clubs, or pulley-weights. I prefer the last at all times when convenient. A suitable machine can be obtained for the moderate sum of ten dollars. I consider Reach's "O.K." machine by all odds the most useful in the market, and it is the cheapest, especially when one takes into consideration the numerous exercises for which it can be adjusted.

A lady who has just left for her home was under my care for a week, receiving instructions in calisthenic and pulley-weight exercises for two purposes: One series, to antagonize a dorso-lumbar curve, and the other to equally strengthen the muscles of her back and thus enable her to hold herself as erect as was intended by nature. She has a machine at home and will continue her work until this is no longer needed. In her case the cure will be permanent. Had she received instructions in only those exercises which antagonized her curves, she would have made a temporary recovery only to lapse into a reversed curvature.

Club Foot due to muscular weakness, as in cases caused by anterior poliomyelitis, are best treated with special exercises. One plan is to brace such a club foot in leather and steel, thus forcing the foot into proper position without any direct effort to regenerate the lost muscle power. Everything is left to time and the curative powers of nature. But this is neither scientific nor for what the physician receives his pay. The muscles actually atrophy to such an extent while braces are worn that they can never recover their functions. Another method, most ingenious, less unsightly than the former, and somewhat better, though also defective, is that which uses the artificial rubber muscle. If I am not mistaken, this was introduced a decade ago, by the ingenious Dr. V. P. Gibney, of New York. But the serious objection to the rubber muscle is that it also largely destroys the functional activity of the affected muscle by doing for it all its work. The plan of treatment which I advocate in all such cases is to use the brace where it is necessary to guard against accidental dislocation. The patient should only wear it when obliged to be on the feet, especially in locomotion. The rubber muscle should be worn when braces are not necessary, and when for æsthetic reasons it is desired to hide the deformity, but at all other times the foot should be permitted to fall into a natural position while exercises are practiced to develop the affected muscles. They should also be faradized while the cord should be moderately galvanised. I of course only refer to those cases in which the motive power has not been lost.

It has quite frequently been said that a child is a small savage undergoing civilization. It is irregular in its habits and tends to gormandize, as well as eat and drink without regard to the wholesomeness of what is within its reach. Regular physical exercise teaches it system, care, and discipline. Many children have a defective digestion due to many causes, common among which are defective circulation, defective nervous force, and defective muscle force in the stomach and belly walls. These are all remedied by proper exercise. Many forms of indigestion we all know yield kindly to suitable exercise, and in no class of individuals is this more so than in children.

Some children are morose, some have mental torpor, some are lazy, and so I could go through a list of ailments referable to the tone of the central nervous system. Now a fact that is but little appreciated is that, physical exercise is a nervous stimulant and tonic of the highest value, in fact, I believe it to have no par, and this conviction is the result of a large unbroken series of practical clinical observations. I know of no better demonstration of the effect of exercise in sharpening the wits than that given by Dr. Hamilton D. Wey in his reported experiments with some dullard criminals in the New York State Reformatory, at Elmira. It has the same beneficial effects in improving the disposition, for I have seen many disagreeable children become cheerful and good natured after becoming actively interested in a

course of physical education. The exceptions are temporary and due to conceit growing out of distinctions earned by superior accomplishments in contests. As a rule this condition does not last.

Systematic physical exercise is impossible without personal cleanliness. Children who are brought up familiar with the gymnasium and track are clean and regular in their habits. Together with a weak body there is nearly always associated a high degree of backwardness due to false modesty, and also considerable lack of confidence. Now these are almost invariably lost after one or two years of gymnasium and out door athletic work. That this is a valuable change for those who in later years must fight the world's great battle cannot be gainsaid.

As physicians we all know the objections to the customary drinking of intoxicants and the use of tobacco. Their employment conflicts most positively with good athletic work of any kind. An early physical training of children compels them, or at least urges them, to dispense with intoxicating drinks or any form of tobacco. This alone would be reason enough to justify a demand for the early physical training of our children if there were no others. No athlete can get along without fresh and wholesome food. Therefore greater care in the acquirement of both of them would inevitably result from proper physical exercise.

The Physical Education Society of Pennsylvania has so far directed its main efforts towards introducing into the public schools of the State a system of compulsory physical education. It now exists in some parts of the country, notably in Milwaukee where the German Turners are doing so much good to the rising generation. It is confidently hoped that in less than another year Pennsylvania will be enrolled among those few States that have made a systematic attempt at the physical as well as the mental education of their children.

I can think of no better conclusion to this paper than a quotation from a former contribution of mine on this subject:

"1. The object of physical culture is to develop the material body, and with it, of necessity, the mind and morals.

"2. Like most potent agencies, it is much abused and far too little understood.

"3. It absolutely forbids smoking.

"4. It absolutely forbids the drinking of alcoholic or malt beverages.

"5. It insists upon the necessity of regularity in living, especially as regards time of sleeping, eating, exercise, and recreation.

"6. It enforces a good substantial dietary that will never be forgotten.

"7. It discountenances all kinds of vice.

"8. It is rigid in discipline without seeming so to those disciplined, and develops implicit and willing obedience to advisors.

"9. It has a marked effect upon the growth of the body and mind.

"10. It develops to a high degree the valuable qualities of hope, confidence, courage, deference, obedience where proper, independence, perseverance, ambition, temperance, and determination.

"11. It is, in short, the most valuable preparation of the young for the cares and trials of adult life, and aids young and old alike to ward off disease and mitigate its effects."

129 South Thirty-Sixth St., Philadelphia.

THE CONTROL OF EPIDEMIC DISEASES.

Read before the Section of State Medicine, at the Fortieth Annual Meeting of the American Medical Association, June, 1889.

BY G. T. SWARTS, M.D.,
OF PROVIDENCE, R. I.

By epidemic diseases we usually consider diseases which are contagious or infectious. I wish to include within this group all other diseases which may attack an unusual number of persons within a short space of time, as trichinæ "poisoning," disease resulting from the ingestion of diseased meats and other foods, poisoning from canned goods, diarrhœal disease resulting from the ingestion of contaminated milk, tuberculosis as disseminated by man or infected milk or flesh of animals so diseased—in fact any sudden onset of a number of cases in which often the physician is at a loss to make a diagnosis, but which by eliminative investigation proves to be due to some common cause, as contamination of milk, water supply, or air. Any control which may be of practical and most valuable service in such sudden outbreaks must be prompt.

It has been customary for several years in most cities to keep a record of the deaths resulting from the zymotic diseases. Later, from interest or curiosity, or later still, from practical use, it was made compulsory that the physician should report all such cases as might come under his care to the health authorities. In many cities, from the known contagiousness of these diseases, an immediate control of the cases is made by placing the case and the family, and those immediately exposed thereto, under quarantine. This is made more or less strict, and hence more or less of a success, as the advanced knowledge of the health officer may order, or in proportion as the health officer may have been able to affect public opinion. The family is warned not to receive visitors, the house is placarded, the premises inspected for unsanitary conditions which might have been a provoking or assisting cause in the production of the disease, and remedied as soon as possible for assistance in the recovery of the patient.

But without constant supervision and having ready the agents whereby an eliminative exami-

nation can be made, much valuable time may be lost, and what with a few cases could be easily fixed upon as a cause, becomes later, by the result of man's natural desire to protect himself and from fear, a mixed question. The physician, hearing of the prevalence of a certain line of symptoms, most naturally sees an almost similar line in the next case that he meets, and reports the case as the same as the one prevailing; and yet, under no stress of an epidemic, such a line of symptoms would find its way into a natural category.

In order that a control should be kept up it is necessary that some organized authority, such as a board of health or sanitation, should be established, whose legal powers and executive ability should have wide scope and cover considerable area. Where such authority borders upon other provinces a systematic exchange of suspicious conditions of cause or of result should be kept up, that each might serve the other.

In all epidemics of a serious character the experience has been that the disease has gained a wide spread before any organized movement for its study can be made. In order to control this a few cases should suffice to give the suspicion to an authority already established. In order that such authority may be able to take advantage of such ready action, it must be equipped with an assistance which is constantly in operation, and which should include within its working staff not only a chief officer, but also a medical inspector conversant by daily practice with inspecting and collecting for information every minute detail about the condition and associations of each individual case, whether the case be a typical one, or merely a suspect. The chief officer should have for assistance a chemist, a bacteriologist and a competent veterinarian, that with as little delay as possible any suspected contamination of the ingesta of the cases may be investigated.

There can be but three ways in which an epidemic disease (omitting those of nervous contagion, as hysteria, etc.) may originate, viz: either by inhalation of contaminated air, or by ingestion of fluids or solids. If a comprehensive control can be kept upon these three things by such a corps of assistants as has been cited, the chances of spread of disease can be reduced to a minimum.

Such a chief officer should be kept informed of the state of the various water supplies of his district, knowing the sources thereof and the many points where contamination might take place. This should include not only river, pond or well supply, but should extend to a control of all mineral waters, whether local or imported, and also its condition during storage or filtration. The source of every quart of milk received in his province should be known, as also the water supply of the cattle supplying the milk, and the physical condition of each individual animal in the herd should be known.

This seems at first thought as a vast undertaking, from our not having already such a control; but this was carried out in France as soon as the convention on tuberculosis made its report. Considering that milk is so common a food, and its defects in the way of tuberculous contaminating influences from disease on the animals, producing gastric and eruptive disturbances, especially in children, its chances of contamination by dilution and lack of cleanliness in handling, it is well worth all the attention which can be given to it, if a perfect control is desired. A control of the filthy methods in use for the collection of milk would alone do much towards assisting infants and children to tide over the heated term, and assist the typhoid patient with this as his only food to a chance of recovery.

A control upon the contamination of air is attempted in most cities by destroying all refuse matter by removal of decaying animal or vegetable matter to an unfrequented place, either for burial or cremation; also by checking the influx of foul air from cesspools and drains by the introduction of a trap and tight connections of waste and drains. A constant examination of the air in suspicious localities should be kept up, especially in places of public assembly, as in schools. As illustrating the method I would recommend in epidemic control I will cite two recent epidemics within this State.

The first occurred in the town of Bristol. Over one hundred people were attacked within the space of a few weeks with symptoms which resembled typhoid fever. The town had no working force for investigation, and the State Board of Health was in a similar condition of inefficiency. The writer was requested by the Council of the town to investigate the disease prevailing. The cases had been very generally reported by the physicians in attendance. A visit was made to the premises of each case, and every influence to which they had been exposed was given attention. This included, besides the examination of the sanitary condition of the premises, the source of milk and water supplies, the occupation, whether recently away from home, the ice supply; also the different ponds and tracts where the ice was gathered, and the water shed supplying the same, the vicinity of the pumping station and the bank of the river giving the water supply for some distance up the stream, and the storage tank or, reservoir. The meteorological observations of the previous months, the subsoil and strata in and about the town were all examined. The direction of previous epidemics was also noted. By recording the results of all the examinations together, and by such a method only, can an eliminative selection of cause be found.

In addition to this a chemical examination of the water supply was made, a bacteriological ex-

amination of the water and milk supplies, and also of the stools from the patients, but no typhoid bacilli were found. Eliminative evidence showed without doubt that a particular source of milk was a factor in the production of the disease.

This source of milk being shut off the epidemic ceased. The next point to be determined was whether the cows supplying this milk were diseased or whether they were ingesting material which might influence the character of the milk, and yet prove innocuous to the animals, and if such material were present, to determine whether it was air, water or food. To determine this a bacteriological examination of the air was made, samples being taken from in and about the barn before and after sweeping of the floor, which operation was performed just before the milking time and which created much dust. Nothing of note developed in the cultures, except the organisms usually found in air, the sarcinæ and one colony of the bacillus prodigiosus. Examinations of the milk were then made, taking specimens first from the cows direct, next from the pails, then from the strainer, and from the cans, directly after being filled, after they had stood in the ice box, and later after it had been delivered in town. Neither specimen developed in the cultures anything which would answer the test of Gaffky's typhoid bacillus, but each contained numerous colonies of a bacillus which resembled the wurzel or root-like bacillus. Gaffky's. This bacillus is found commonly in stagnant water, ditch or bog water or superficial garden soil. This discovery led to a suspicion of the drinking supply of the animals, and which had already been condemned, for the animals themselves were apparently healthy except one or two of the eight had glandular enlargements under the jaw which might or might not have been tubercular deposits.

The source of water supply for the animals had already been found to be a low marshy, boggy district, the pond being formed from the accumulation of surface water, being not over 6 or 7 inches deep and stagnant. The cows were in the habit of standing and walking about in this water, making it very muddy and drinking as their needs might demand. This pond also received the drainage from the farm-yard, which had not been cleaned of cow refuse for several years.

The wurzel bacillus has been shown to have no influence upon animals, and is non-pathogenic as far as man is concerned. The query might be presented, whether or not the organism, under the favorable conditions of warmth and food as found in the udder, or possibly in the cans after standing, might not have produced a ptomaine which, in its action upon the human intestine and other systems, was capable of producing a disease resembling typhoid fever. The cows were removed from this feeding ground and taken to another farm ten miles away. The milk from these cows continued to be sold in the town, and yet there appeared no more cases of the disease. Such an examination should be made at once, and by a corps whose special lines would be working at once that the epidemic character of the disease may be checked. One of the difficulties presented by delay in commencing the investigation was shown here. The customers of this particular milkman had become suspicious of the milk on account of there being several cases in his family and up to that time one death. As a result they refused to be supplied longer by him and obtained their supply from other milkmen. Naturally the other milkmen had not a sufficient supply to meet this sudden demand, the suspected milkman had more to sell on account of his losing customers, so he naturally supplied the other milkmen who were short, so that when the writer began the investigation he had more to unravel than if it was taken at the beginning. The above transactions actually took place, and the suspected dealer often was sold out before the other dealers.

The second epidemic[1] to which I wish to refer is a "short, sharp and decisive" one which occurred in Providence during the past fall. The disease was typical typhoid fever. The control was as follows:

The writer, as Medical Inspector, received the reports of all cases from the physicians attending. The premises of the cases were inspected, the sanitary conditions were at once improved when necessary, printed regulations as to disinfection were distributed, and cleanliness of the hands and cooking utensils urged upon the nurses and attendants. The sources of the water, ice, milk, etc., were noted. Within a week it was evident that an unusual number of cases were occurring. The Superintendent of Health immediately increased the force of medical inspectors in order that all cases reported in a morning's mail might be inspected before the following day.

No three milk supplies were from the same source. The sanitary conditions of the premises were comparatively good. The water supply was, however, common to all, namely, the city river supply. The Superintendent of Health at once suspected the river, and found that the river had been polluted with typhoid excrement about eighteen days previous during a heavy rainfall, the stools from typhoid patients having been thrown on the banks of the river for two or three months.

Fæces from the typhoid cases were examined and the typhoid bacillus found. Cultures taken from the spleen of the only autopsy made developed all cultures of the same bacillus, and the lesions of the intestines were typical of the disease.

Advantage was taken of the knowledge that

[1] The epidemic lasted about three weeks and between 200 and 300 cases occurred. The epidemic increased suddenly and as suddenly declined. See Report Supt. of Health, Providence, 1889.

small domestic filters are collectors of filth, and with this filth organisms of various sorts accumulate and increase with great rapidity in numbers.[2] Several of these small filters were taken from the faucets supplying water in houses where the disease existed, and were submitted to bacteriological examination by three bacteriologists independent of each other. Two of the three found the typhoid bacilli within the water of the filters, and from one developed great quantities of organisms found commonly in fæces.

All this was done at the commencement of the epidemic, as the Health Department had at its disposal the means and willingness to make a study of associations and, being in working order, was at an early date cognizant of the presence of the disease and of all the conditions by the daily reports of the Medical Inspector. As the only precautionary measure possible, the public were at once advised to boil all drinking-water in order to destroy any specific organisms which might have found their way to the tap, and to remove all filters from the faucets. The epidemic rapidly subsided, whether from cessation of the contamination or from the destruction of the bacilli in boiling the water it is impossible to say ; probably much from both.

CHRONIC CYSTITIS IN THE FEMALE.

Read in the Section of Obstetrics and Diseases of Women at the Fortieth Annual Meeting of the American Medical Association, June, 1889.

BY AUGUSTUS P. CLARKE, A.M., M.D.,
OF CAMBRIDGE, MASS.

Of the various diseases the gynecologist is called upon to treat but few have oftener proved more vexatious or intractable than chronic cystitis. After a careful study of the pathology and histology of this peculiar condition several factors appear to comprise, to a greater or lesser extent, either singly, variously or remotely, its etiology. The lesions or morbid processes giving rise to cystitis, whether in the acute or chronic stage, are numerous. Each case should be considered according to its own history and peculiar indications. In the consideration of the subject of cystitis it is well to keep in mind the structure and anatomical relations of the mucous membrane of the bladder. Reference to the character and arrangement of the epithelial cells shows that there are several layers. The deeper layers are composed of cells that are conical or cylindrical in appearance. The superficial layer of the mucous membrane is provided with a squamous epithelium. The same arrangement is continuous with the structure of the urethra. This epithelial structure of the mucous membrane extends to the urethra, where numerous racemose mucous glands, the glands of Littre, have ducts opening on its surface. Littre's glands vary in size. They often exceed 1 millimetre in diameter and attain from 3 to 6 millimetres in length. Their office is to secrete mucus which protects the subjacent structure from immediate contact with the urine and from ferments or poisons which so frequently gain access into the urethra and bladder. The submucous coat is also provided with an extensive plexus of veins and loose areolar or connective tissue. The muscular coat of the urethra is formed of two layers, and is continuous with that of the bladder. This arrangement of parts gives the urethra and ostium vesicæ not only a remarkable power of distensibility but also a wonderful immunity against ordinary accidents and conditions that occur to the viscus itself.

In reading some of the published articles and discussions on cystitis a person unacquainted with the subject might be led to suppose that the formation of the structure of the female urethra and bladder is of such a nature as to be totally devoid of any important resisting power against the open or insidious attacks of the elements within or without, and that on the event of the urine becoming concentrated or a bacterium termo gaining admission into its folds the most disastrous consequences may be expected to follow. It should not be forgotten that the urine which is pale and of low specific gravity, voided by the nervous or hysterical female, often causes quite as much irritation or pain as is experienced in cases in which there is an abundance of sediment. In the treatment of cystitis the point should be emphasized that the symptoms present are often but a mere expression of the organ that there has occurred a lesion or a morbid process, and possibly at a distance from the part seemingly affected. In every case the true factors should be sought for and considered.

The following cases are appended to show the importance of some of the factors entering into the causation of the affection.

Case 1.—Mrs. R., æt. 21 years, married three years, miscarried in January, 1888. She recovered and remained in good health until January, 1889, when she began to suffer from severe cystitis. The patient consulted a female physician who prescribed vaginal irrigation of water at the temperature of 100° F., as well as the hot pack. This treatment was continued for some weeks without any marked beneficial effects. At th time I was called, April 17, I found the patient was four months advanced in pregnancy. She was suffering from a marked anteflexion. The suffering caused by the cystitis was unusually severe; there was also nausea and morning sickness. The patient was kept in bed; the uterus was restored and maintained in the proper position, at first by vaginal tampons, later by a properly fitting pessary and an abdominal belt. After two weeks of treatment nearly all vesical

[2] See Proceedings of Rhode Island Medical Society, 1888.

disturbance ceased, the nausea and vomiting in great measure passed away.

The importance of fibrous adhesions or cicatricial bands in prolonging an attack of cystitis occurred some years ago in the case of Mrs. D., æt. 37 years. The patient had been married but had borne no living children. There was a history of pelvic inflammation from which she had recovered, but a cystitis remained which was a constant source of trouble. When I was called to treat her a vaginal examination was refused. At length I succeeded in convincing the patient that an examination was necessary I found a strong fibrous band connecting the posterior lip of the cervix to the vaginal wall below. This firmly held the uterus and dragged upon the bladder. The index finger could be made to pass around it when it was divided, and the uterus and the bladder were restored without further trouble. The patient soon recovered from the vesical disturbance.

Vascular growths within the meatus urinarius often give rise to very distressing symptoms of cystitis. At the meeting of the Ninth International Medical Congress held in Washington, D. C., September, 1887, I presented to the Section in Gynecology a paper on the histology and pathology of these growths. I also reported several cases in which the removal of the growths was followed by relief of all distressing symptoms. Diseases and injuries of the ovaries often give rise to prolonged and intractable attacks of cystitis. Mrs. G., æt. 34 years, mother of two children, was of sound constitution and in good health until January, 1888, when, on alighting from a horse-car, she sustained concussion of the right ovary. There was severe shock at the time, and the patient was kept in bed for some three weeks, and was unable to attend to any of her domestic affairs for three months. Careful examination revealed a thickening of the vault of the vagina on the right, also an undue closure of the cervix. There was no displacement of the ovary; her menstruation was disturbed and for awhile became irregular. The disturbance extended to the urinary organs. Though repeated examinations of the urine showed no signs of the presence of pathological processes of the bladder, an intractable attack of cystitis nevertheless supervened, which continued more or less even after the legal settlement of the claim against the company had been made.

Mrs. L., æt. 34 years, of a phthisical family, had a history of pelvic inflammation of long standing. There was a manifest enlargement of the left ovary which from time to time was the source of great annoyance and was attended occasionally with severe cystitis. Repeated examination of the urine gave only negative results. Opiates and other remedies usually employed gave only temporary relief. Washing out the bladder with a solution of nitrate of silver, 30 grs. to the ounce, as has been recommended by some writers, though a painful procedure, yielded most excellent results.

Anal and rectal inflammations are not uncommon causes of cystitis. Mrs. E., æt. 33 years, who had been married and was a primipara, began in March, 1881, to suffer from cystitis. I was first called in attendance April 28, 1881. At the time I was called there was severe pain and irritation of the urinary passages. The urine had to be voided at frequent intervals and each effort was attended with much strangury. The urine was turbid, the deposit being amorphous urates. Vaginal examination revealed nothing of importance. There were internal hæmorrhoids and a fissure on the anterior aspect of the rectum. Under ether the hæmorrhoids were removed and the anal sphincter ruptured. This was followed by speedy relief and the patient in a short time was fully restored to health.

Another case in which a severe and prolonged cystitis was caused by reflex symptoms was that of Miss F., æt. 19 years. So marked and severe were the symptoms that, before the case was fully investigated, nothing but a calculus was believed to be the cause of the trouble. The urine for a long time had contained a deposit of white corpuscles resembling that of pus and mucus. Under ether an anteflexion of the uterus was discovered which on being restored and held *in situ* by properly fitting pessaries, the painful symptoms at length yielded and the urine finally became normal in appearance.

Sometimes urethritis accompanied by cystitis arises from a contracted and an hypertrophied condition of the meatus. In such cases micturition is usually accompanied by more or less tenesmus. This condition of the parts may continue for years and cause a great deal of suffering. In the treatment nothing has given me so great a satisfaction as that of rapid dilatation of the urethra. Mrs. R., æt. 60 years, had suffered for five years from painful micturition. No cause at first could be assigned for this affection. The urine was turbid, alkaline, and contained an abundance of mucus and triple phosphates. The patient had been under a long course of constitutional treatment without any apparent benefit. At the time I was called, October 30, 1876, the meatus and urethra were abnormally narrow and the parts around were thickened. Under ether the urethra was dilated sufficiently to admit the index finger. The patient speedily recovered and there has been no return of the affection. Since that I have resorted to the method of rapid dilatation in cases in which tenesmus is a leading feature, and in which the tissues around have been contracted and hypertropied.

There are cases of vesical catarrh in which the walls of the bladder have become so changed and hypertrophied, and the tenesmus so marked a

feature that rapid dilatation, even when supplemented by irrigation carried out with the most improved means at hand, utterly fails to afford relief. In such cases Emmet's operation for artificial vesico-vaginal fistula is not only justifiable but imperatively demanded. On January 24, 1873, I was called to attend Mrs. F., primipara æt. 48 years, who had suffered for several months from vesical catarrh accompanied by violent tenesmus. As every method of treatment tried proved unavailing I advised that the bladder should be incised through the vaginal wall in order to insure easy and complete drainage of that viscus. The advice was readily accepted; accordingly, on February 1, 1873, under ether, an incision was made through the vaginal wall into the bladder. Drainage for awhile was maintained by means of a short silver catheter. The distressing symptoms soon gave way, and on February 26 the patient felt such a sense of relief that she regarded herself as substantially cured. The artificial fistula closed spontaneously. The patient lived thirteen years after, and during that period there was no return of the complaint. Since then the relief afforded in other cases in which this method was adopted has been almost as singularly marked. Of course the difficulties sometimes attending the subsequent closure of an artificial fistula must not be altogether overlooked. Speaking from my own experience, I have found that the cases in which the operation for kolpocystotomy or artificial vesico-vaginal fistula is required are such as have lasted for years. The mucous membrane will often be found detached, and an inflammation extending to the muscular and even to the serous coats. The mucous and vaginal surfaces will often be found encrusted with phosphatic deposits and other products that emit an offensive odor. Should the inflammation continue unchecked, permanent contraction of the bladder would ensue, the ureters would become congested and occluded, the urine become alkaline and loaded with mucus, pus or other abnormal products. Although it would be deemed rash and unnecessary to resort to the operation for kolpocystotomy in all cases of troublesome cystitis, on the other hand, should the operation be deferred until all other methods have failed, the integrity of the kidneys will be jeopardized and all opportunity for cure or relief may be lost. The following case illustrates in some measure the importance of this statement: Mrs. D., æt. 31 years, was the mother of three children, the youngest of whom was 5 years. The labors were normal and she recovered well from each confinement. The last confinement occurred in August, 1880. During the month of May, 1881, the patient sustained a severe fall from a flight of stairs, fracturing her right leg in the upper third and injuring her back and loins. The fracture at the time was attended to, and a satisfactory union took place. After the second week of the injury a cystitis more or less severe supervened. There was, however, no paralysis of the limbs, and the patient was not prevented from going out and taking short drives and considerable exercise on foot. During the spring of 1882 the cystitis became more severe. The patient was confined to bed. An examination showed there was no flexion or displacement of the uterus. The ordinary course of treatment was pursued, including vaginal and vesical irrigation. All operative measures proposed were declined. The case dragged on until the autumn of 1885, when it terminated fatally. The autopsy showed that the bladder was thickened and contracted into a small mass. The ureters were thickened and plugged and also tortuous; the kidneys were found to be in a state of granular degeneration.

In reviewing the history and symptoms of this case I have no doubt, had operative measures in the spring of 1882, when the troublesome symptoms became so pronounced, been undertaken and carried out from time to time as indicated, the patient's life would have been saved and much severe suffering prevented.

Sometimes cases of cystitis that are apparently quite severe readily yield to the milder means of treatment. Faradism with one pole near the urethra and the other over the bladder gives speedy relief. Saline laxatives and mineral waters are of great benefit in the treatment. A douche of corrosive sublimate 1–2,000 will often prove beneficial in cases in which no marked organic changes have occurred, and in which the troublesome symptoms are due to septic ferments and to uncleanliness generally. No general rule or special course of treatment can be laid down that is applicable alike in all cases. Suffice it to say that each case as it occurs must be studied and treated according to the peculiar indications. The medical attendant should recognize the fact that some cases of chronic cystitis apparently very formidable, as already stated, will readily yield to the simple and mild method of treatment employed; while others may occur that will defy all recognized methods of treatment and can be cured or corrected only after the most skilful and ingenious operations have been resorted to.

A Munificent Friend of the Sick.—The name of the donor of the large sum of a hundred thousand pounds for a convalescent home near London has come to light, notwithstanding his wishes to keep in the background; his name is Peter Reid. He has already been prominent for generous interest in hospitals and other charitable institutions, but his last grand gift to the sick poor of London was announced as from an anonymous source in January last.

ALCOHOLIC TRANCE IN CRIMINAL CASES.

Read in the Section of Medical Jurisprudence, at the Fortieth Annual Meeting of the American Medical Association, June, 1889.

BY T. D. CROTHERS, M.D.,
OF HARTFORD, CONN.
SUPERINTENDENT WALNUT LODGE; EDITOR JOURNAL OF INEBRIETY, ETC.

The frequent statement of prisoners in court that they did not remember anything about the crime they are accused of, appears from scientific study to be a psychological fact. How far this is true in all cases has not been determined, but there can be no question that crime is often committed without a conscious knowledge or memory of the act at the time.

It is well known to students of mental science, that in certain unknown brain states memory is palsied, and fails to note the events of life and surroundings. Like the somnambulist, the person may seem to realize his surroundings and be conscious of his acts, and later be unable to recall anything which has happened. These blanks of memory occur in many disordered states of the brain and body, but are usually of such short duration as not to attract attention. Sometimes events that occur in this state may be recalled afterwards, but usually they are total blanks. The most marked blanks of memory have been noted in cases of epilepsy and inebriety. When they occur in the latter they are called *alcoholic trances*, and are always associated with excessive use of spirits. Such cases are noted in persons who use spirits continuously, and who go about acting and talking sanely, although giving some evidence of brain failure, yet seem to realize their condition and surroundings. Some time after, they wake up and deny all recollection of acts and events for a certain period in the past. This period to them begins at a certain point and ends hours or days after, the interval of which is a total blank, like that of unconscious sleep. Memory and certain brain functions are suspended at this time, while the other brain activities go on as usual. In all probability, the continued paralysis from alcohol not only lowers the nutrition and functional activities of the brain, but produces a local palsy, followed by a temporary failure of consciousness and memory, which after a time passes away.

When a criminal claims to have had no memory or recollection of the crime of which he is accused, if his statement is true, one of two conditions is probably present, either epilepsy or alcoholism. Such a trance state might exist and the person be free from epilepsy and alcoholism, but from our present knowledge of this condition it would be difficult to determine this fact. If epilepsy can be traced in the history of the case, the trance state has a pathological basis for its presence. If the prisoner is an inebriate, the same favoring conditions are present. If the prisoner has been insane, and suffered from sun or heat stroke, and the use of spirits, are the symptoms of brain degeneration, the trance state may occur any time. The fact of the actual existence of the trance state is a matter for study, to be determined from the history of the person and his conduct; a grouping of evidence that the person cannot simulate or falsify, evidence that turns not on any one fact, but on an assemblage of facts that point to the same conclusion.

The following cases are given to illustrate some of these facts, which support the assertion of no memory of the act by the prisoner in court:

The first case is that of A., who was repeatedly arrested for horse stealing, and always claimed to be unconscious of the act. This defense was regarded with ridicule by the court and jury, and more severe sentences were imposed, until finally he died in prison. The evidence offered in different trials in defense was, that his father was weak-minded and died of consumption, and his mother was insane for many years, and died in an asylum. His early life was one of hardship, irregular living, and no training. At 16 he entered the army, and suffered from exposure, disease and sunstroke, and began to drink spirits to excess at this time. At 20 he was employed as a hack driver, and ten years later became owner of a livery stable. He drank to excess at intervals, yet during this time attended to business, acting sanely, and apparently conscious of all his acts, but often complained he could not recollect what he had done while drinking. When about 34 years of age he would, while drinking, drive strange horses to his stable, and claim that he had bought them. The next day he had no recollection of these events, and made efforts to find the owners of these horses and return them. It appeared that while under the influence of spirits the sight of a good horse hitched up by the roadside alone, created an intense desire to possess and drive it. If driving his own horse, he would stop and place it in a stable, then go and take the new horse, and after a short drive put it up in his own stable, then go and get his own horse. The next day all this would be a blank, which he could never recall. On several occasions he displayed reasoning cunning, in not taking a horse when the owners or drivers were in sight. This desire to possess the horse seemed under control, but when no one was in sight all caution left him, and he displayed great boldness in driving about in the most public way. If the owner should appear and demand his property he would give it up in a confused, abstract way. No scolding or severe language made any impression on him. Often if the horse seemed weary he would place it in the nearest stable, with strict orders to give it special care. On one occasion he joined in a search for a stolen horse, and found it in a stable

where he had placed it many days before. Of this he had no recollection. In another instance he sold a horse which he had taken, but did not take any money, making a condition that the buyer should return the horse if he did not like it. His horse stealing was all of this general character. No motive was apparent, or effort at concealment, and on recovering from his alcoholic excess, he made every effort to restore the property, expressing great regrets, and paying freely for all losses. The facts of these events fully sustained his assertion of unconsciousness, yet his apparent sanity was made the standard of his mental condition. The facts of his heredity, drinking, crime and conduct, all sustained his assertion of unconsciousness of these events. This was an alcoholic trance state, with kleptomaniac impulses.

The next case, that of B., was executed for the murder of his wife. He asserted positively that he had no memory or consciousness of the act, or any event before or after. The evidence indicated that he was an inebriate of ten years' duration, dating from a sunstroke. He drank periodically, for a week or ten days at a time, and during this period was intensely excitable and active. He seemed always sane and conscious of his acts and surroundings, although intensely suspicious, exacting, and very irritable to all his associates. When sober he was kind, generous and confiding, and never angry or irritable. He denied all memory of his acts during this period. While his temper, emotions, and conduct were greatly changed during this time, his intellect seemed more acute and sensitive to all his acts and surroundings. His business was conducted with usual skill, but he seemed unable to carry out any oral promises, claiming he could not recollect them. His business associates always put all bargains and agreements in writing when he was drinking, for the reason he denied them when sober. But when not drinking his word and promise was always literally carried out. He broke up the furniture of his parlor when in this state, and injured a trusted friend, and in many ways showed violence from no cause or reason, and afterwards claimed no memory of it. After these attacks were over, he expressed great alarm and sought in every way to repair the injury. Finally he struck his wife with a chair and killed her, and awoke the next day in jail, and manifested the most profound sorrow. While he disclaimed all knowledge of the crime, he was anxious to die and welcomed his execution. This case was a periodical inebriate with maniacal and homicidal tendencies. His changed conduct, and unreasoning, motiveless acts, pointed to a condition of trance. His assertion of no memory was sustained by his conduct after, and efforts to find out what he had done and repair the injury.

The third case, that of C., was a man of wealth and character who forged a large note, drew the money and went to a distant city on a visit. He was tried and sentenced to State prison. The defense was no memory or consciousness of the act by reason of excessive use of alcohol. This was treated with ridicule. Although he had drank to excess at the time of and before the crime, he seemed rational and acted in no way as if he did not understand what he was doing. Both his parents were neurotics, and he began to drink in early life, and for years was a moderate drinker. He was a successful manufacturer, and only drank to excess at times for the past five years. He complained of no memory during these drink paroxysms, and questioned business transactions and bargains he made at this time. On one occasion he went to New York and made foolish purchases which he could not recall. On several occasions he discharged valuable workmen, and when he became sober took them back, unable to account for such acts. These and other very strange acts continued to increase with every drink excess. At such times he was reticent and seemed to be sensible and conscious, and did these strange acts in a sudden, impulsive way. The forged note was offered boldly, and no effort was made to conceal his presence or destination. When arrested he was alarmed and could not believe that he had done so foolish an act. This was a clear case of alcoholic trance, in which all the facts sustained his assertion of no conscious memory of the crime. In these three cases the correctness of the prisoners' assertions of no memory was verified by all the facts and circumstances of the crime. The mere statement of a person accused of crime, that he had no memory of the act, should lead to a careful examination and be only accepted as a fact when it is supported by other evidence.

The following case illustrates the difficulty of supporting a prisoner's statement of no memory when it is used for purposes of deception:

Case E.—An inebriate killed a man in a fight, and was sentenced to prison for life. He claimed no memory or recollection of the act. I found that when drinking he seemed conscious of all his surroundings, and was always anxious to conceal his real condition, and if anything had happened while in this state he was very active to repair and hush it up. He was at times quite delirious when under the influence of spirits, but would stop at once if any one came along that he respected. He would, after acting wildly, seem to grow sober at once, and do everything to restore the disorder he had created. The crime was an accident, and at once he attempted concealment—ran away, changed his clothing, and tried to disguise his identity; when arrested, claimed no memory or consciousness of the act. This claim was clearly not true, and contradicted by the facts.

In a recent case F. shot his partner in business while both were intoxicated, and displayed great cunning to conceal the crime and person; then, after elaborate preparations, went away. He made the same claim of defense, which was unsupported by any other evidence or facts in his previous life. He was executed. Of course it is possible for the trance state to come on suddenly, and crime be committed at this time; still, so far, all the cases studied show that this condition existed before, and was the product of a growth beginning in brief blanks of a few moments and extending to hours' and days' duration. Unless the facts indicated the trance state before the crime was committed, it would be difficult to establish this condition for the first time, followed and associated with the crime.

I think in most of these cases, where this defense is set up, there will be found certain groups of cases that have common physical conditions of degeneration. These groups of cases I have divided from a clinical standpoint, the value of which will be more as an outline for future studies.

Probably the largest number of criminal inebriates who claim loss of memory as a defense for their acts are the alcoholic dements. This class are the chronic inebriates of long duration: persons who have naturally physical and mental defects, and who have used spirits to excess for years. This, with bad training in early life, bad surroundings, and bad nutrition, have made them of necessity unsound, and liable to have many and complex brain defects. Such persons are always more or less without consciousness or realization of their acts. They act automatically only, governed by the lowest and most transient impulses. Crimes of all kinds are generally accidents growing out of the surroundings, without premeditation or plan. They are incapable of sane reasoning or appreciation of the results of their conduct. The crime is unreasoning, and general indifference marks all their acts afterwards. The crime is always along lines of previous conduct, and never strange or unusual. The claim of no memory in such cases has always a reasonable basis of truth in the physical conditions of the person. Mania is very rarely present, but delusions and morbid impulses of a melancholic type always exist. The mind, like the body, is exhausted, depressed, and acts along lines of least resistance.

The second group of criminals who claim no memory are those where the crime is unusual, extraordinary, and unforeseen. Persons who are inebriates suddenly commit murder, steal, or do some criminal act that is foreign to all previous conduct. In such cases the trance condition may have been present for some time before and escaped any special notice, except the mere statement of the person that he could not recollect his acts. The unusual nature of the crime, committed by persons who never before by act or thought gave any indication of it, is always a factor sustaining the claim of no memory. The explosive, unreasoning character of crime always points to mental unsoundness and incapacity of control.

A third group of criminals urge this statement of no memory, who, unlike the first group, are not imbeciles generally. They are positive inebriates, drinking to excess, but not to stupor, who suddenly commit crime with the most idiotic coolness and indifference, never manifesting the slightest appreciation of the act as wrong, or likely to be followed by punishment. Crime committed by this class is never concealed, and the criminal's after conduct and appearance gives no intimation that he is aware of what he has done. These cases have been termed moral paralytics, and the claim of the trance state may be very likely true.

A fourth group of cases where memory is claimed to be absent occurs in dipsomaniacs and periodical inebriates, who have distinct free intervals of sobriety. This class begin to drink to great excess at once, then drink less for a day or more, and begin as violently as ever again. In this short interval of moderate drinking some crime is committed of which they claim not to have any recollection.

Other cases have been noted where a condition of mental irritation or depression preceded the drink explosion, and the crime was committed during this premonitory period, and before they drank to excess. The strong probability of trance at this period is sustained by the epileptic character of such conduct afterwards. The trance state may justly be termed a species of *aura*, or brain paralysis, which precedes the explosion.

In some instances, before the drink storm comes on, the person's mind would be filled with the most intense suspicions, fears, delusions, and exhibit a degree or irritation and perturbation unusual and unaccountable. Intense excitement or depression, from no apparent cause, prevails, and during this period some crime may be committed; then comes the drink paroxysm, and later all the past is a blank. Trance is very likely to be present at this time.

In these groups the crime is generally automatic, or committed in a manner different from other similar crimes. Some governing center has suspended, and all sorts of impulses may merge into acts at any moment. The consciousness of acts and their consequences are broken up. The strong probability is that these trance blanks begin in short periods of unconsciousness, which lengthen with the degeneration and mental feebleness of the person. The obscurity of these conditions, and the incapacity of the victims to realize their import, also the absence of any special study, greatly increases the difficulty. It will be evident from inquiry that trance states

among inebriates are quite common, but seldom attract attention unless they come into legal notice. The practical question to be determined in a given case in court is the actual mental condition of the prisoner, who claims to have no recollection of the crime. This a class of evidence that must be determined by circumstantial and collateral facts, which require scientific expertness to gather and group. The court can decide from the general facts of the crime and the prisoner whether his claim of no memory may possibly be true, and order an expert examination to ascertain the facts. This should be done in all cases where the prisoner is without means, in the same way that a lunacy commission is appointed to decide upon the insanity. The result of this expert study may show a large preponderance of evidence sustaining the claim of no memory, or the opposite. If the former, the measure of the responsibility must be modified, and the degree of punishment changed. While such cases are practically insane at the time, and incapable of realizing or controlling their acts, they should be kept under legal and medical surveillance for a lifetime, if necessary. Such men are dangerous, and should be carefully watched and deprived of their liberty for a length of time depending on recovery and capacity to act rationally and normally. They are dangerous diseased men, and, like victims of contagious disease, must be housed and treated.

The future of such cases depends on the removal of the causes which made them what they are. The possibility of permanent restoration is very promising in most cases. How far alcoholic trance exists in criminal cases is unknown, but the time has come when such a claim by criminals cannot be ignored, and must be the subject of serious inquiry. Such a claim cannot be treated as a mere subterfuge to avoid punishment, but should receive the same attention that a claim of insanity or self-defense would. This is only an outline view of a very wide and most practical field of medico-legal research, largely unknown, which can be seen in every court room of the land. These cases appeal to us for help and recognition, and the highest dictates of humanity and justice demand of us an accurate study and comprehension of their nature and character.

The following summary of the leading facts in this trance condition will be a standpoint for other and more minute investigations:

1st. The trance state in inebriety is a distinct brain condition, that exists beyond all question or doubt.

2d. This brain state is one in which all memory and consciousness of acts or words are suspended, the person going about automatically, giving little or no evidence of his real condition.

3d. The higher brain centers controlling consciousness are suspended, as in the somnambulistic or hypnotic state. The duration of this state may be from a few moments to several days, and the person at this time may appear conscious and act naturally, and along the line of his ordinary life.

4th. During this trance period crime against person or property may be committed without any motive or apparent plan, usually unforeseen and unexpected. When accurately studied such a crime will lack in the details and methods of execution, and also show want of consciousness of the nature and results of such acts.

5th. When this condition passes away the acts and conduct of the person show that he did not remember what he had done before. Hence his denial of all recollection of past events, and his changed manner confirm or deny his statements.

6th. When such cases come under judicial inquiry the statement of the prisoner requires a scientific study before it can be accepted as a probable fact. It cannot be simulated, but is susceptible of proof beyond the comprehension of the prisoner.

7th. In such a state crime and criminal impulses are the result of unknown and unforeseen influences, and the person in this condition is dangerous and an irresponsible madman.

8th. This condition should be fully recognized by court and jury, and the measure of responsibility and punishment suited to each case. They should not be punished as criminals, nor should they be liberated as sane men. They should be housed and confined in hospitals.

ON THE ORGANIZATION AND ABSORPTION OF STERILIZED DEAD BONE DOWELS.

Read in the Section of Surgery and Anatomy, at the Fortieth Annual Meeting of the American Medical Association, June, 1889.

BY WILLIAM BARTON HOPKINS, M.D.,

SURGEON TO THE EPISCOPAL HOSPITAL, AND SURGEON TO OUT-DEPARTMENT OF PENNSYLVANIA HOSPITAL.

AND BY

CHARLES B. PENROSE, M.D., PH.D.,

ASSISTANT SURGEON TO THE HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA; SURGEON TO OUT-DEPARTMENT OF PENNSYLVANIA HOSPITAL.

Mr. Wm. Scovell Savory, in 1864, demonstrated, by a series of experiments performed upon various animals, principally the rabbit, that ivory pegs driven into healthy living bone would, after a time, undergo greater or less absorption. He found, however, that in order to obtain this result, it was necessary that the peg be driven tightly into a hole which was a trifle too small for it. Upon this observation, he concluded that firm pressure upon the surface of dead bone against the living was the essential factor in causing the absorption. His experiments were, of course, done long before the antiseptic era, and we may

venture to assume that that gentleman to-day shares our opinion, that the dead bone was absorbed when it impinged firmly against the living because the closeness of its contact diminished the space for the accumulation of septic matter. Bone pegs have since been used to fix together extremities of bones after excisions; but we believe that the experiments here recorded are the first of the kind which have been performed, with antiseptic precautions, upon the lower animals, and with the view of determining how long foreign bone can be determined upon for giving fixation, and the ultimate changes which take place in it during the processes of absorption or organization, when placed in contact with living osseous tissue.

Experiment No. 1.—A large cur pup was etherized, and after exposure of the shaft of the right femur, a sterilized ox bone dowel was placed in a hole, which had been drilled transversely through the shaft, and was cut off flush with the surface. The incision for exposing the bone in this case, as in all the subsequent experiments, being carried down in the intermuscular septum overlying the linea aspera, little muscular tissue was divided, and hence but little bleeding occurred during the operation. The wound was approximated by a continuous suture of chromicized catgut, and was sealed with collodion and powdered iodoform. The wound healed without suppuration, and at the end of five weeks the dog was again etherized and the section of the femur in which the bone dowel had been placed, was removed. From this, as from other experiments, Dr. Allen J. Smith made careful microscopic sections, the best of which were unfortunately destroyed in the fire at the histological laboratory of the University of Pennsylvania. The remarkable changes which occurred in five weeks are shown in Figure 1, and in the microscopic section, Figure 2. Two distinct phenomena are apparent: that of organization, and that of absorption. The extremities of the dowel which were in contact with the shaft of the femur had become thoroughly organized, being full of Haversian canals continuous with those of the dog bone, of which they had become part; and on fresh section showed the pink hue of living vascular bone. The intervening portion, between these extremities, corresponding to the medullary cavity, showed no attempt at organization, as it was pure white on fresh section, and contained no Haversian canals, but the erosions on its surface clearly indicated that rapid absorption was taking place.

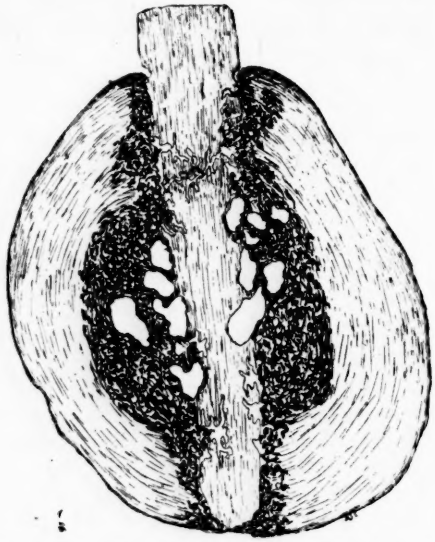

FIGURE 1.—Showing bone dowel after five weeks undergoing organization and absorption.

A deep furrow which surrounds the dowel at the point where it penetrated the periosteum, shows an effort of this membrane to sever that portion of the dowel which projected beyond the level of the shaft of the femur, and would in all probability, had the action gone on, have allowed this free portion to drop off into the surrounding tissues.

FIGURE 2.—Showing microscopic appearances of Experiment No. 1.

Experiment No. 2.—The left femur of a healthy carriage dog was exposed and a dowel an eighth of an inch in diameter was introduced, as in the preceding experiment. At the end of seven weeks the femur at the site of the operation was again sought, and the only evidences that remained of the introduction of the peg were pin-point dimples in the opposite sides of the shaft of the bone. This section was sent to Dr. Smith unsawn, and we have his statement that organization and absorption had been so complete that almost all vestiges of the dowel had disappeared. All of the microscopic sections from this specimen were destroyed in the fire. Figure 3 represents a memory sketch.

Experiments Nos. 3, 4, 5, 6, 7, 8, 9 and 11 were all done with the view of determining the effect produced by splicing together the fragments of the femur with bone after it had been divided. While the success attained in these experiments was only measurable, they may be considered

satisfactory when the inordinate liberties which were taken with the bone are remembered. The simplest form of splicing was done by two transfixing dowels, as would be applicable to the fixation of a simple oblique fracture. A transverse section of the shaft was spliced by the introduction of a dowel, which accurately fitted into the medullary cavity one inch or less on either side of the fracture; the pin being, in some of the experiments, held in position above and below by

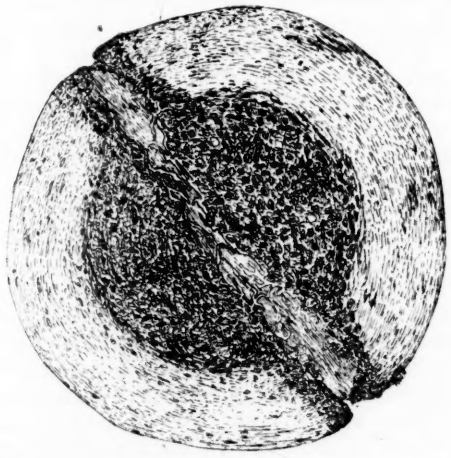

FIGURE 3.—Memory sketch of the appearances of bone dowel after seven weeks.

cross-pins of a smaller size, made to pass through it and the shaft of the bone. Again, an hiatus in a resected femur was filled up by a medullary splice, retaining the fragments at a distance of half an inch apart. The material of which this medullary pin was composed was either dead bone or freshly removed living dog-bone.

All of these cases suppurated, and at the end of periods varying from nine weeks to nine months the dog was killed and the femur removed. In all more or less necrosis was found to have occurred, accompanied by different degrees of osteitis, and without organization of the dowels. The best result was obtained in Experiment No. 7. Three-fourths of an inch (containing in it the site of a previous experiment) of the femur was

FIGURE 4.—Femur of dog in which dowel filled medullary cavity, after nine months; entire absorption, union with angular deformity.

resected and a dowel a quarter of an inch in diameter introduced into the medullary cavity, which latter had been reamed out with a quarter inch drill. This joint was made very firm by eighth-of-an-inch cross pegs, above and below. In this case a sinus continued for several months, but finally closed, leaving the dog with a very strong, useful limb. At the end of nine months the dog was killed and the femur removed. Firm union, with angular deformity (Figure 4), was found to have taken place; a few small fragments of necrosed dog-bone, undergoing absorption, were found on section in a small cavity; but no signs remained of the heavy medullary dowel, nor of the small cross pegs.

Experiment No. 10.—Experiment No. 10 was simply a repetition of experiments Nos. 1 and 2, the dowel being allowed to remain eight weeks. The processes of absorption and organization were found to have gone on, as in the other cases, to a somewhat more advanced degree. Throughout its entire length, extension of the blood vessels of the bone had penetrated the dowel (Figure 5), particularly so at points where it was in continuity with endostium.

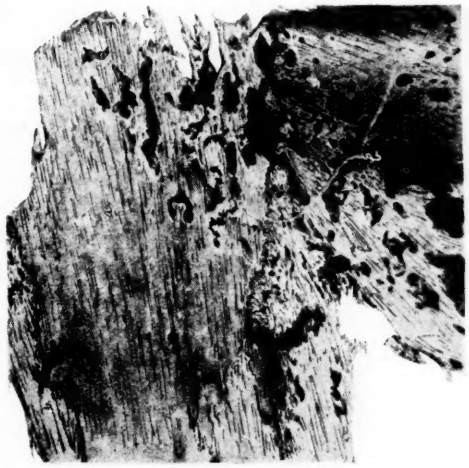

FIGURE 5.—Showing microscopic appearance of bone dowel after eight weeks (the dowel occupying the left side of the field).

Mode of Preparation.—The dowels used in these experiments were made from ordinary beef bone, as it is prepared for use in the arts. They were sawn into square rods, and then turned by *dowel-cutters* of appropriate sizes. After thorough boiling they were placed in an alcoholic solution of corrosive sublimate (1–1000), ready for use. They were not found to swell at all in this solution, and therefore accurately fitted the drill-holes made for them, even after prolonged immersion.

The only cases which have come under our observation in which these dowels were used upon the human subject, were in two osteoplastic resections of the foot, after the method of Wladimiroff-Mikulicz, performed, the one by Dr. Ferdinand Gross, at the German Hospital in Philadel-

phia, in 1888, and the other by Dr. W. B. Hopkins, at the Episcopal Hospital, in 1887. In both these cases dowels were used to fix the tarsus to the leg. In both they answered a good purpose, and gave rise to no subsequent trouble.

From these experiments we base the following deductions:

First. That where sterilized dead bone is placed, under favorable circumstances, in contact with living bone, it undergoes organization. When, on the other hand, it is acted upon by periosteum it is absorbed, and when placed in the medullary cavity, in not too large bulk, organization combined with absorption takes place.

Second. That these processes go on, perhaps, most actively between the fifth and the eighth week, and are not necessarily associated with any inflammatory action.

Third. That therefore, where these dowels are employed to pin together fragments of bone after fracture, to fix the extremities of bones after resections, or for any other mechanical purpose in surgery to which they are adapted, they may be relied upon to do their work for a period of one month or six weeks, and hence to give ample time, as a rule, for union to occur. After this, their presence being no longer required, they gradually lose their identity in the surrounding bone, and disappear.

MEDICAL PROGRESS.

THE BACILLUS OF DIPHTHERIA AND ITS PATHOGENIC VALUE.—From January 1 to May 1, 1889, twenty-nine persons, among them twenty young girls, were attacked by diphtheria in the little village of Horn, in the Netherlands; the mortality from the disease was 34 per cent.; its origin remained undiscovered. For two years before no case of diphtheria had been observed among the chickens or pigeons of this locality.

The authors, MESSRS. SPROUCK, WINTGENS and DOETS, were able to make bacteriological studies of the pseudo-membranes at various stages of the disease, which in 37 per cent. of the cases was accompanied by progressive paralysis which, except in one case, did not extend to the larynx.

In the seven cases which they studied they were able to obtain pure cultures of the bacillus described by Klebs in 1883, but they were not able to find the spores described by Babès.

Rats and mice proved refractory to subcutaneous inoculation made from these cultures, which, however, proved fatal to guinea pigs and rabbits in five or six days; after some days of entire freedom from symptoms, these animals displayed, among other morbid phenomena, a paralysis beginning in the hind legs, and then becoming general. If tracheotomy was first performed and the wounded mucous membrane was inoculated from the cultures, characteristic pseudo-membranes soon formed.

The bacilli found by these investigators in the false membranes were not discoverable in the lymphatic glands, the blood, or the viscera. The activity of the poisoning depends upon the presence of a chemical substance produced by the bacilli in the bouillon which is injected; this substance becomes more active in proportion to its age; the injection in the auricular vein of half a cubic centimetre of a culture sterilized by filtration, and twenty-eight days old, is sufficient to kill a rabbit in three days. The injections of filtered cultures produce true nephritis with albuminuria; the same filtered cultures lose their toxic power when boiled.—*La Sem. Méd.*

CURE OF MALIGNANT ANTHRAX.—The state of a patient in the later stages of malignant anthrax is desperate, and recovery very unusual. Dr. LANDE describes in the *Mémoires de la Société de Médecine de Bordeaux*, 1889, two cases where this condition was reached, yet the patients were saved by subcutaneous injections of carbolic acid. In the first case, a man aged 27, the upper lip was the seat of anthrax; in the second, a woman aged 65, the anthrax developed on the interscapular region. Both subjects were very ill, low delirium and other unfavorable symptoms being present. The injections were generally made into the subcutaneous tissue of the peripheral inflamed zone of the anthrax. The strongest solution used when the symptoms were severe consisted of 15 grams of neutral glycerine and an equal part of distilled water, in which 3 grams of crystals of carbolic acid were dissolved. The injections were made at five points around the anthrax, and represented a total dose of 50 centigrams of pure carbolic acid. This solution caused severe pain, but rapid improvement of the symptoms. This 10 per cent. solution was stronger than any previously employed for the same purpose by Boeckel, Raimbert and others. Nevertheless, it does not appear to cause sloughing of the tissues. A 5 per cent. solution is strong enough, in the opinion of Dr. Lande, except in very severe cases where the patient feels little pain. The injections must be repeated until the bad symptoms cease to recur, which may occur within forty-eight hours.

NITRITE OF AMYL is commended as the most rational and successful antidote to use where chloroform or cocaine seem to threaten life by their unfavorable action on the heart. A few drops of nitrite of amyl administered by inhalation will be one of the most probable means of restoring the heart's action.

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LONDON OFFICE, 57 AND 59 LUDGATE HILL.

SATURDAY, APRIL 5, 1890.

ELECTRICITY FOR FIBROIDS.

The present status of electricity in gynecology was very elaborately portrayed the evening of November 27, 1889, at the New York Academy of Medicine, at a meeting which will become memorable for bringing together the opinions of the majority of those in America who have a right to be considered authorities on this subject.

No subject in gynecology during the last few years has received more attention than the one of treatment of fibroid tumors of the uterus. Upon one side we have arrayed the surgeons with the oöphorectomy and the hysterectomy as the alternatives, while opposed to them are the equally stubborn conservatives with galvanism as a remedy *par excellence*, to be dosed accurately according to the prescription of DR. GEORGE APOSTOLI.

The importance of the question leads us to give from the electricity standpoint, the gist of the views of those taking part in the discussion at the late Academy meeting, with conclusions by the writer derived as a result of a perusal of the entire evening's proceedings.

On this subject DR. ALEXANDER J. C. SKENE, of Brooklyn, said: One class of men has condemned this treatment without mercy. Another class has obtained the most perfect results—and still another class has had an intermediate experience. They have been able to relieve their patients of most or all of their symptoms, and have diminished the size of the tumors or retarded their growth.

Dr. Skene continues: "I have accepted the testimony of this latter class of witnesses because it apparently contained the most truth, and also because it agreed with what little experience I have had in my own practice. . . . . It has also been claimed that this agent is dangerous, but that has been fully met by the fact that all the benefit can be obtained without taking the risks that were at one time supposed to be unavoidable.

"Perhaps the most important question in the whole discussion is the relative merits of this and other methods of treatment. The claims of hysterectomy and the removal of the ovaries for fibromata have been urged with great vigor by those who are strongly addicted to surgery. There is, however, no evidence that this kind of surgery is safer or surer in its results than electricity."

DR. A. D. ROCKWELL, of New York, said: "That the galvanic current often completely dissipates fibroid tumors of the uterus few will, I believe, affirm. . . . As a rule, the reduction is comparatively slight unless suppuration is excited, which may be easily done. . . . We treat uterine fibroids not because they are unsightly, but because associated with them are a train of symptoms sometimes of the most distressing character. These symptoms can, it is believed, be relieved to a greater or less extent by electrolysis, and sometimes so completely relieved as to lead to the belief, so far as the patient is concerned, that the tumor has entirely disappeared . . . it is simply a symptomatic cure."

DR. AUGUSTIN H. GOELET, of New York, said: "It would seem unnecessary to add further testimony in favor of the treatment of uterine fibroids by electricity, since such authorities as SPENCER WELLS and THOMAS KEITH have abandoned hysterectomy and openly avow themselves in favor of APOSTOLI's method. As to fibroids, it does not always dissipate the tumor entirely, but the size is very materially lessened; its growth is arrested and the symptoms are relieved. The pain is promptly lessened, hæmorrhage is absolutely controlled, and, as the tumor becomes reduced in size, the pressure symptoms are likewise removed."

DR. E. L. H. MCGINNIS, of New York, said: "That it is slow in its effects I know, and we must not be disappointed if marked diminution in the size of the mass is not noticed at once. The great majority of cases show little change under a month of treatment, which should be ap-

plied three times weekly. But I have found one (very rarely, two) thorough applications quite sufficient to control the most obstinate hæmorrhage, provided a sufficiently strong current is used, and, what is *most* important, that every part of the endometrium be brought in contact with the electrode."

DR. A. H. BUCKMASTER, of Brooklyn, recited some important experiments which have a direct clinical bearing on the subject, among others is the following: "The heart of an anæthetized dog was exposed and a current of forty milliampéres made to traverse a portion of the ventricle. A piece of the ventricle in the direct line of the current was excised and another some little distance from the direct influence of the current. When examined under the microscope the piece from the direct line of the current showed that the striæ had become markedly granular, while the piece outside of the direct line of the current preserved the muscle cells unaltered. This granular appearance of the striæ would indicate degeneration of the muscle bundles. . . . This is the first evidence of absolute molecular disintegration of living cells by the interpolar action of the galvanic current, where such process is confined to the cells."

DR. PAUL F. MUNDÉ, New York, in speaking of Aportoli's method said, that while he believed it efficient for the removal of pain and the checking of hæmorrhage, and admitted that the patients felt better for its use, not a single tumor which had come under his notice had been much reduced in size. He considered the galvano-puncture through the vagina the ideal treatment. The four cases in which he had employed it had been absolutely cured--that is the tumors disappeared entirely, not a vestige being left.

DR. FRANKLIN H. MARTIN, of Chicago, said: "My experience in the treatment of fibroid growth of the uterus by electricity amounts, in round numbers to two hundred cases. In that number of cases, not more than five failed to continue the treatment until results could be estimated. Of those who continued treatment and made a fair test of its value, up to the present time but three have failed to obtain relief. . . . . I am fortunate, considering the great number and variety of cases treated, to be able to record no deaths; the results on the whole have been extremely gratifying. About 84 per cent. are symptomatically cured, with an additional 4 per cent of actual cures."

Among the names of those giving testimonies in behalf of electricity at this meeting will be noticed not only those with reputations as electricians, but also those having reputations among the first of our American gynecologists. The general tone of the discussion was calm, and particularly free from the exuberant and unsafe positivism of the enthusiastic hobbyist. From a perusal of its records we formulate the following conclusions:

1. Electricity will relieve the pain due to pressure and sympathetic disturbances in the majority of fibroid tumors treated by that agent, in from one to six applications.

2. Hæmorrhage due to fibroids can be relieved by the positive galvano-caustique applications of electricity in all cases in which a sufficiently concentrated dose can be applied to the greater portion of the endometrium.

3. A large percentage of tumors of enormous size can be checked in growth and often reduced in size by an intelligent and persistent application of this agent, while tumors of medium and smaller size can be markedly reduced, and in a few instances be made to totally disappear.

4. The majority of patients, while under this form of treatment, improve rapidly in general health from the characteristic tonic effect exerted upon the whole system.

5. According to the only statistics given, 84 per cent. of patients submitted to the treatment are symptomatically relieved, 4 per cent. absolutely cured, while 12 per cent. are not benefited, or failed to make a fair test of the treatment.

6. The treatment is not by any means painless in a large number of cases, although an anæsthetic is seldom resorted to. A well tried system of concentration, however, has been adopted, by which, as a rule, all the benefits of the agent can be obtained without transcending the toleration of the patient.

THE NEW YORK OPHTHALMOLOGICAL SOCIETY has elected the following officers for 1890: Dr. Samuel B. St. John, of Hartford, President; Dr. H. S. Oppenheimer, Vice-President; and Dr. John E. Weeks, Secretary and Treasurer.

THE ELIMINATION OF MORPHINE INJECTED HYPODERMICALLY THROUGH THE STOMACH.

At the meeting of the Society of East German Alienists at Jena, June 12, 1889, DR. HITZIG, of Halle, reported some investigations which his assistant, DR. ALT, had been making upon this subject. His attention was first called to it by observing that a dog that ate the matter vomited by another dog, to which a hypodermic injection of morphine had been administered previously, also vomited in a short time. A chemical test of the matter vomited by the first dog revealed the presence of morphine. Experiments by washing out the stomachs of dogs shortly after the hypodermic administration of the drug showed that its presence could be demonstrated in the stomach in 2¼ minutes after the injection, and that it continued to be eliminated for about an hour. If the stomach was washed out, vomiting did not take place, showing that it was a reflex phenomenon due to the presence of the drug in the stomach, and not a consequence of its direct action on the central nervous system. The other symptoms of poisoning by morphine could also be mitigated by this means, and the lives of dogs thus preserved to which doses of morphine had been given, which were otherwise inevitably fatal. In two cases the animals were kept alive and recovered promptly, after receiving nearly 50 per cent. more than the usually fatal dose. Thus, strange as it might seem, washing out the stomach after poisoning by hypodermic injection proved a life-saving operation. A third of the morphine administered could be recovered in this way within twenty minutes after the injection. Analogous results were obtained by experiments on men. The practical bearing of these facts in cases of poisoning by hypodermic injection of morphine is obvious, and it would seem possible that in case of an overdose taken by the mouth, excretion by the stomach might take place after its contents had been evacuated.

THE SO-CALLED "PECULIAR PEOPLE" AND CONTAGIOUS DISEASE.

There exists in England a small sect known as the "Peculiar People" whose members resemble certain faith-healing zealots in our own country in the respect that they will not use medicines for the cure of disease and will not employ physicians. In two parishes of Essex, Cressing and White Notley, there has recently been an outbreak of small-pox attended by circumstances, which in the opinion of *The Lancet* tended dangerously to the kindling of a general epidemic. A member of these Peculiar People contracted the disease and neglected every recognized medical and sanitary precaution. The patient had his friends calling upon him with entire freedom, and four or more of these visitors were taken down with the disease also. It was then that the health officials of the locality became aware of the impending spread of the trouble and went to work energetically to check it, and fortunately with success. The position of these officials was an embarrassing one at the outset since they had no isolation hospital whereto they might send any refractory patient who would, for conscience sake, put a whole countryside in jeopardy. It is proposed to have such a hospital provided before the like can occur again. *The Lancet*, however, offers its suggestion that the authorities plan to build a structure which will meet a wider range of exigencies than that through which they have just passed; the writer in that journal holds the opinion that the small contagious-disease hospitals, thus procured, on the spur of some sudden emergency, are seldom made ready in time for the epidemic responsible for its procurement, and have seldom been found afterwards to properly serve the later requirements of the place. That plan which has served more usefully than any other, according to the writer of the comments in the journal, has been the rapid fitting out of a small house-hospital which is hired for the occasion; this is preëminently the fact regarding outbreaks of small-pox, where so much can fortunately be accomplished by vaccination.

EDITORIAL NOTES.

HOME.

MICHIGAN STATE MEDICAL SOCIETY.—The twenty-fifth annual meeting of this prominent organization will be held in the city of Grand Rapids on the 19th and 20th of June next, the date having been changed to avoid conflict with that of the American Medical Association. It is one of the representative organizations in this country, and the adjacent States will do well to be offi cially represented by delegates in that as-

semblage. The President's Address will be delivered by Dr. George E. Frothingham, of Detroit. Subject—"The Need of Extensive Organization and pursuit of a Fixed Policy as a Means of promoting our Professional Interests."

TENNESSEE STATE MEDICAL SOCIETY.—The fifty-seventh annual session of the Tennessee State Medical Society will he held at Memphis, April 8, 9, and 10, at the Gayoso Hotel.

THE NORTH PHILADELPHIA HOSPITAL has been incorporated. It will probably be enabled to begin operations within the current month, with six beds at the outset. A large building of fifteen rooms, on North Broad street, will be immediately prepared for occupancy.

DR. S. WIER MITCHELL, of Philadelphia, is the author of a dramatic poem, entitled "The Masque," which was publicly rendered and favorably received, on March 8, at a theatre in Philadelphia.

THE NEW YORK HOSPITAL is about to add a solarium to its other appliances for the benefit of its convalescents.

THE NEW YORK EYE AND EAR INFIRMARY laid the cornerstone of its new building, on Second avenue, on March 15, in the presence of a notable body of clergy and citizens of public spirit. Ex-Mayor Hewitt was called to the chair, in the absence of Mr. Chauncey M. Depew, who was reported sick with influenza. This institution is seventy years old and has an endowment fund of a quarter-million of dollars. The new building will cost $100,000, towards which $70,000 have been subscribed and $30,000 must be looked for from private sources. The staff consists of forty-six surgeons, who minister to the needs of nearly 20,000 patients annually.

MISSISSIPPI STATE MEDICAL ASSOCIATION.—The next annual session of the Mississippi State Medical Association will be held in Jackson on April 16.

FLORIDA STATE MEDICAL ASSOCIATION.—At a meeting of the Executive Committee of the Florida Medical Association, held in Jacksonville, February 20, it was decided to change the place of the annual meeting from Key West to Ocala. This was deemed best after consultation with the President of the State Board of Health, lest quarantine regulations might interfere with the meeting at Key West. The meeting will be held in Ocala on April 8, the session being opened in the Opera House at 3 P. M.

LECTURES ON HYGIENE AND PUBLIC HEALTH.—By invitation of the trustees of the Mott Memorial Library, Dr. Alfred L. Carroll is to deliver to physicians and students a free course of fifteen lectures on hygiene and public health, during April and May, at 4 o'clock P. M. on Mondays, Wednesdays and Fridays, at the Mott Hall, 64 Madison avenue, New York City.

WESTERN PENNSYLVANIA MEDICAL COLLEGE.—The fourth annual commencement exercises of the Western Pennsylvania Medical College were held in the Grand Opera House, Pittsburg, on March 27. The degree of M.D. was conferred on twenty-nine graduates, being about 25 per cent. of the class in attendance during the past term. In the evening of the same day the Alumni Association of the college, now numbering 120, was entertained by the faculty at a banquet provided at the Seventh Avenue Hotel.

FOREIGN.

THE EXTENSION OF EPIDEMIC INFLUENZA EAST AND WEST.—The advance of epidemic influenza into Persia has been reported as far eastward as Teheran, at which place as many as seventy deaths in a day have been credited to that disease. Several members of the Shah's family have been among the sick.

The epidemic has extended into Mexico, and has been raging with great virulence in the State of Hidalgo.

DR. HANS MEYER, of Berlin, is one of a party of two Germans, who have made the ascent of the marvelous peak of Kilimanjaro in East Africa. The report is that they were the first to have ascended to the very summit, seventeen days being the time devoted to the ascent and an exploration of three of the highest points. The aneroid indicated 19,690 feet elevation at the summit.

THE OLDEST FREEMASON IN THE WORLD is said to be Dr. William Salmon, of England, whose age is over one hundred years.

THE INFLUENZA has recently appeared in the Bermuda Islands.

TOPICS OF THE WEEK.

REPORT ON SANITARY REGULATIONS OF THE PAN-AMERICAN CONGRESS.

The Committee on Sanitary Regulations of the Pan-American Congress has made a unanimous report in which it condemns absolute isolation in preventing the spread of epidemics, and recommends in its stead the disinfection of all articles from infected localities before they are permitted to be imported into healthy places. The following propositions have been adopted by the Congress, on recommendation of the committee:

"That, taking the existing state of the relations between the nations of America, it is as practicable as it is advisable, for the promotion of these relations, to establish perfect accord with respect to sanitary regulations.

"That the greater part of the ports of South America on the Atlantic are guided and governed by the decisions of the International Sanitary Convention of Rio Janeiro of 1887.

"That although it does not appear that the plans of the Sanitary Congress of Lima, of 1889, have passed into the category of international compacts, it is to be hoped that they will be accepted by the governments that participated in the said Congress, because those plans were discussed and approved by medical men of acknowledged ability.

"That the Sanitary Convention of Rio Janeiro of 1887, and the draft of the Congress of Lima of 1889, agree in their essential provisions to such an extent that it may be said they constitute one set of rules and regulations.

"That if these were duly observed in all America they would prevent under any circumstances the conflict which usually arises between the obligation to care for the public health and the principle of freedom of communication between countries.

"That the nations of Central and North America were not represented either in the Sanitary Convention of Rio Janeiro or the Congress of Lima, but that they might easily accept and apply to their respective ports on both oceans the sanitary regulations before cited."—*Sanitary News.*

CHEMISTRY AND ITS RELATION TO MEDICINE.

Among the remarkable developments of medical science in recent years is the important position assigned to chemical discoveries and theories, and their relation to practical medicine. For many years the aphorism of Boerhaave, "*Chymia egregia ancilla medicinæ, non alia pejor domina*," defined the position chemistry ought to hold in its relationship towards scientific medicine—an aphorism which in more recent times has received point and force from the ridicule cast upon chemical theories by the teaching of Graves and Trousseau. Now, however, chemistry promises to play once more a dominant part in the medical theories and speculations of the day, and, under more competent guidance than was possible when the aphorism was originally launched against the iatro-chemists of the seventeenth century, will, it is to be hoped, avoid the errors of the past, and solve many important problems urgently requiring elucidation. As evidence of this reaction in favor of chemical speculation we need only point to the chemical investigations being carried on at the present time in physiology, pathology, pharmacology, and in clinical medicine, and to the large sums expended in almost every school on increased laboratory accommodation, to say nothing of the new laboratories constructed on the Embankment at great expense by the Conjoint Board of the Royal Colleges of Physicians and Surgeons, and which will shortly be opened for original research. With this resumption of activity in the domain of medical science, the teaching of elementary chemistry assumes an importance not hitherto accorded it. For a sound and efficient training in the principles of both physics and chemistry will be an essential equipment of the student of the future if he is to understand the facts that chemical research has to put before him throughout his professional career. These remarks have seemed necessary, since there is, we believe, a disposition to relegate the teaching of elementary chemistry to a more inferior position than it even now holds in the medical curriculum. Such a step would be disastrous, and would be utterly retrograde. For if, during the many years that chemistry was but little regarded as an auxiliary to medicine, it formed one of the essential features of our examinations, now that a more extended knowledge of the subject is required for the new departure chemistry has taken as applied to medicine, it would be absurd to reduce the elementary teaching to what a sixth form boy could pick up during his last half-year at school.—*The Lancet.*

THE MEDICAL LIBRARY OF THE UNIVERSITY OF PENNSYLVANIA.

The medical library of the University of Pennsylvania is said to be growing very rapidly, having received numerous gifts of books and money. The two principal donors are Dr. Alfred Stillé, who presented a collection of books, numbering 3,000 bound volumes and 5,000 unbound volumes and pamphlets, and Dr. William Pepper, who more recently gave the greater portion of his own medical library; $15,000 in money has also been received, one-half of which has been expended in the erection of the new library building, while the other half is to be retained as the nucleus of an endowment fund for the purchase of books and medical journals.—*Medical Record.*

M. PASTEUR AND THE RABBIT PEST IN AUSTRALIA.

In respect to a statement alleging that the Australian Government had refused to allow M. Pasteur the reward of £20,000 offered to the person who should suggest the best plan for the destruction of the rabbits that infest that colony, M. Pasteur is reported to have said that this was not so, for the simple reason that he had never sought it, and that, owing to circumstances over which he had no control, he could not claim such a reward. He had sent M. Loir, his nephew, and another of his assistants to Australia in order to try the experiments which he had made in his laboratory on a more extended scale. The assistants returned to France after a few months, discouraged. According to M. Pasteur, they

were not allowed by the Commission appointed by the Australian Government to make any important experiments. This Commission permitted the assistants to inoculate a few rabbits, and the experiments were successful enough to warrant a further extension of the authorization; but all sorts of delays and adjournments were caused, until the assistants abandoned all hope of being able to carry out the purpose for which they had undertaken the voyage to Australia.

A BILL TO REGULATE MEDICAL PRACTICE IN RHODE ISLAND.

A Bill with the above title is now before the Legislature of that State. The first section of the act provides that only registered physicians shall be allowed to practise medicine in this State, and section 2 is as follows: "Every person in order to be a registered physician within the meaning of this act shall be either a graduate in medicine or a practising physician. Graduates in medicine shall be such as have obtained a diploma from a regularly incorporated school or college of medicine, and shall have presented to the State Board of Medicine satisfactory evidence of their qualifications. A practising physician shall be deemed to be a person, who for the ——— years next preceding the passage of this act has continuously practised medicine in this State, and who shall have presented to the State Board of Medicine satisfactory evidence of his qualifications, and any other person who shall have presented to the State Board of Medicine satisfactory evidence of his qualifications to practise medicine."

A PARADISE FOR STRONG-MINDED WOMEN.

Ladies ambitious of academical distinction should betake themselves to Belgium, where Napoleon's maxim, *La carrière ouverte aux talens*, without invidious distinction of sex, has now received the sanction of the Legislature. On January 30 the Chamber of Representatives, acting in concert with the Ministry, passed an enactment that henceforth all university lectures and courses of instruction, together with all academical degrees, shall be open to women. Moreover, whereas they have hitherto only been allowed to practise certain branches of the healing art, both medicine and pharmacy are now thrown open to them without restriction. It is not clear why legislators of such advanced views should have expressly protected the legal profession from the intrusion of forensic-minded ladies, but this inconsistency may not be altogether unconnected with the fact that the majority of the members of the Chamber of Representatives are lawyers. Nothing is said as to the Church, but if women may become Doctors—that is, teachers—of Divinity, it would be unfair to exclude them from the pulpit.

RECENT SAVING OF LIFE IN MICHIGAN.

In a carefully prepared paper, read about the Sanitary Convention at Vicksburg, the proceedings of which are just published, Dr. Baker gave official statistics and evidence which he summarized as follows:

"The record of the great saving of human life and health in Michigan in recent years is one to which, it seems to me, the State and local boards of health in Michigan can justly 'point with pride.' It is a record of the saving of over one hundred lives per year from small-pox, four hundred lives per year saved from death by scarlet fever, and nearly six hundred lives per year saved from death by diphtheria—an aggregate of eleven hundred lives per year, or three lives per day, saved from these three diseases! This is a record which we ask to have examined, and which we are willing to have compared with that of the man who 'made two blades of grass grow where only one grew before.'"—*American Practitioner and News.*

STATISTICS OF BREATHING.

In each respiration an adult inhales one pint of air.

A man respires sixteen to twenty times a minute, or twenty thousand times a day; a child twenty-five to thirty-five times a minute.

While standing, the adult respiration is twenty-two; while lying, thirteen.

The superficial surface of the lungs, *i. e.*, of their alveolar space, is two hundred square yards.

The amount of air inspired in twenty-four hours is ten thousand litres (about ten thousand quarts).

The amount of oxygen absorbed in twenty-four hours is five hundred litres (744 grams); and the amount of carbonic acid gas expired in the same time, four hundred litres (911.5 grams).

Two-thirds of the oxygen absorbed in twenty-four hours is absorbed during the night hours from 6 P. M. to 6 A. M.

Three-fifths of the total carbonic acid is thrown off in the day time.

The pulmonary surface gives off one hundred and fifty grams of water daily in the state of vapor.

An adult must have at least three hundred and sixty litres of air an hour.

The heart sends through the lungs eight hundred litres of blood hourly, and twenty thousand litres, or five thousand gallons, daily. The duration of inspiration is five-twelfths, of expiration seven-twelfths, of the whole respiratory act; but during sleep inspiration occupies ten-twelfths of the respiratory period.—*Annals of Hygiene.*

THE INSCRIPTION ON THE CORNER-STONE OF THE PENNSYLVANIA HOSPITAL.

The corner-stone of the Pennsylvania Hospital was recently uncovered, and the inscription was found well preserved in clear and sharply-cut letters. It read as follows:

IN THE YEAR OF CHRIST
MDCCLV
GEORGE THE SECOND HAPPILY REIGNING
(FOR HE SOUGHT THE HAPPINESS OF HIS PEOPLE)
PHILADELPHIA FLOURISHING
THIS BUILDING
BY THE BOUNTY OF THE GOVERNMENT
AND OF MANY PRIVATE PEOPLE
WAS PIOUSLY FOUNDED
FOR THE RELIEF OF THE SICK AND MISERABLE
MAY THE GOD OF MERCY
BLESS THE UNDERTAKING

PRACTICAL NOTES.

RESORCIN IN WHOOPING COUGH.

This remedy seems to be gaining ground in the treatment of pertussis. In a late number of the London *Lancet* it is stated that Dr. Justus Andeer, who had previously written in recommendation of the employment of resorcin in whooping cough, has recently published some fresh cases illustrating, as he believes, the advantage of this method of treatment. One of the patients was his own child, a little girl of 7 years of age, who during an epidemic of measles and whooping cough was attacked by the catarrhal form of the latter affection and suffered severely for a week, notwithstanding a change of climate. He then prescribed an ounce of a 2 per cent. solution of resorcin four times a day, part of which solution the child was to gargle, and part of which she was to take. This very soon began to show signs of affecting the course of the disease, for on the second day the fits of coughing very perceptibly diminished, and in eight or ten days the child was quite free from coughing. Five other children, who had been unsuccessfully treated for some time, immediately began to improve under the resorcin treatment. In the case of a baby of 6 months old a sweetened solution of the strength of ½ per cent. was given by means of a feeding-bottle and answered admirably.—*Cincinnati Med. Journ.*

CHLOROFORM WATER IN CROUP.

Dr. H. B. Bashere has lately obtained excellent results from chloroform water in the treatment of false croup, and regards it as superior to chloral in this affection, in that it is not so dangerous and is eliminated in part by the lungs. Of course its action is local, and its value, probably, due to the sedative effect upon the sensory filaments of the superior laryngeal nerve. He makes use of a solution consisting of 5 to 10 minims of chloroform to an ounce of water, to which is added a little glycerine to aid the solubility of the chloroform. A teaspoonful of this is given every half hour during an attack, and if there is any dyspnœa the following day, a teaspoonful is given every two hours, increased in frequency to every hour during the evening. This method of treatment is especially applicable to those cases in which the dyspnœa and cough continue during the day.—*Medical Record.*

TURPENTINE IN POST-PARTUM HÆMORRHAGE.

"For a number of years," writes a correspondent, "I have used spirits of turpentine in post-partum hæmorrhage, and in every case with the best results. When the ordinary means, that is, friction over the uterus, irritation of the uterus by introduction of the fingers, cold hypodermic injection of ergotine, etc., failed, by saturating a piece of lint with the turpentine, and introducing it with my hand into the uterus and holding it against the walls, rapid contraction took place, and all hæmorrhage instantly ceased. In one or two cases, when the patient was almost pulseless, it seemed to act as a stimulant. On no occasion did its action fail, nor did it cause the slightest inconvenience, except in one, when the side of the patient's thigh was slightly blistered by some that came in contact with it, but it gave very little annoyance. I consider it to be much quicker and safer in its action than any other remedy; it does not cause any injurious result, and besides it is much more easily applied. In country practice, getting hot water or using injections often entails loss of valuable time.—*Lancet.*

A NEW TEST FOR ALBUMIN IN URINE.

Dr. D. Meredith Reese reports in the February issue of the Johns Hopkins Hospital Bulletin on a test series of over eighty cases in the course of an investigation as to the applicability of trichloracetic acid as a test for albumen in the urine. This test is a new one, the first prominent mention that was made of it in English literature being that made in the *British Medical Journal* for November 16, 1889. The reagent may be used either as a solid or as a liquid. According to Dr. Reese, the tests by this substance for albumen in urine were most delicate, the reaction is prompt, the manipulation is not difficult, and no discoloration or colored zone is produced in the specimens.

SALICYLATE OF SODA PER RECTUM.

Dr. Stein, of Saaz, mentions in a Prague medical journal that, having a case of rheumatic fever of a severe and very obstinate nature in a lady with a very sensitive stomach, which refused to tolerate medication of any kind when administered by the mouth, he was able to treat the case satisfactorily by enemata of salicylate of soda. He gave three enemata daily, each containing from 30 to 45 grains of the salicylate. The quantity of liquid used for each was about 8 ounces.

CARBUNCLE TREATMENT.

Drs. Arnozan, Lande and Maurange inject into the cellular tissue of the inflamed peripheric zone 5 grams of a solution composed as follows: Glycerine and distilled water, of each 15 grams; crystallized carbolic acid, 3 grams. The injections were made at five different points around the inflamed region, and represent a dose of 50 centigrams of carbolic acid. Amelioration of the local and general state was prompt, and in twenty-four hours probability of a cure was manifest.

SOCIETY PROCEEDINGS.

Philadelphia County Medical Society.

Stated Meeting, January 22, 1890.

THE PRESIDENT, W. W. KEEN, M.D., IN THE CHAIR.

DR. H. A. HARE read a paper entitled

DEMONSTRATION OF THE EFFECT OF THE ENTRANCE OF AIR INTO THE VEINS.

Some months ago I published an account of experiments on seventy dogs, in which I found that the entrance of air into the veins of living animals was not so lethal as is generally believed. It has been taught that minute globules of air entering the veins will produce fatal results, or, at least, most serious symptoms. The way in which I discovered the fallacy of this was by making injections of solutions of drugs. I found that when a small quantity of air was introduced accidentally, no evil effects resulted. On looking up the literature of the subject I found that the mass of evidence was really against the common belief. There are quite a number of cases on record where patients have died suddenly during operation, and death was attributed to the entrance of air.

In order to be brief, I shall read an abstract from my paper:

"One of the most thorough studies of the subject so far published is undoubtedly that of Wattmann, from whom most of the following information is derived, unless otherwise stated. The first experiments of this kind are attributed to Wepfer, who is said to have killed an ox of stupendous size by blowing air with his mouth into its jugular vein; while Redi, in a letter to Steno, written over two hundred years ago, stated that he had killed in a similar manner two dogs, a horse, a sheep, and two foxes. Similar studies have also been made by Heyde and Brunner. Ruysch, Valsalva, Morgagni, and others, have at autopsies recorded the appearance of quantities of gaseous fluid in the vascular system, which they believed to be air. Very much later, Bichat made startling announcements as to the small amount of air required to cause death when so introduced, but Nysten, a few years later, showed the fallacies in Bichat's assertions.

"In 1818, a patient of Beauchene, at the Hôpital Saint Antoine, while he was extirpating a tumor of the right shoulder and lateral and lower part of the neck, died very suddenly, 'under circumstances which made him believe that this was occasioned by entrance of air into the vascular system through an opening in a vein.' Further cases have since been reported by writers in this country, and abroad by Amussat, Mott, and others.

"The paper of Amussat is one of the most exhaustive of its kind, but its conclusions were vehemently attacked by men no less noted than Velpeau, Gerdy, Blandin and Malle, all of whom asserted that the symptoms detailed were not to be thought due to the entrance of air, but to other extraneous causes.

"In the experiments of nearly all the early investigators, the air was introduced by blowing with the mouth or a syringe, but Amussat carried out a series of studies in which he opened the jugular vein and allowed any air to enter that could do so.

"The experiments of Nysten proved that only large amounts of air produce fatal results, the quantity varying from 40 to 120 cubic centimetres, according to the size of the dog, and he also found that larger amounts must be used to kill the ox or horse.

"Magendie states that he has thrown, with all the force and celerity of which he was capable, forty or fifty pints of air into the veins of a very old horse without his dying immediately, and Cormack blew the contents of his chest, twice filled, into the jugular vein of a horse before the animal exhibited any signs of uneasiness. Barthelemy has also found that in six horses, weakened greatly by the withdrawal of blood, as much as from four to six litres of air must be introduced intravenously to cause death, and estimates, in consequence, that a man weighing 136 pounds would be killed only by two-thirds of a litre. Even the experiments of Amussat force him to the conclusion that a considerable quantity of air must be used to cause death. Ore finds 80 ccm. necessary to cause death in the dog.

"The conclusions to be reached, therefore, from all experimental researches is that enormous amounts of air must enter a vein to cause death, and that no such quantity can possibly find its way into a vein which has been injured with the knife of the surgeon. These are the facts against the prevailing idea; let us see what the facts are for it. The answer is that there are none. While we have a large number of cases reported of sudden death under operations where veins were opened, in the majority of them the cause of death has been guessed at, and not proved. The only case which approaches in any way toward authenticity is that of Mott, who saw a serious but not fatal result induced by the entrance of air into the facial vein, and even this is not a proved case. The case of Barlow is equally doubtful as to the real cause of death.

"There are a number of cases on record where death has resulted, according to the physician in charge, from the entrance of air into the uterine sinuses.

"Supposing that ordinary atmospheric air is really capable of acting in the manner generally thought, the question arises as to the method of its influence. Erichsen believes it to be due to

the frothy state of the blood, which prevents the due transfer of the circulating fluids through the pulmonary tissue, and Bell believed death to be due to the transference of air to the base of the brain.

"Cormack has thought death to be due to gaseous distention of the heart, and Moore thought it to be due to the entrance of air into the cardiac cavities. Other observers have found air in the right heart, and concluded that in this way the blood is prevented from eventually getting to the lungs and general system. Again, it has been thought that the air prevents the closure of the valves of the heart, or that the bubbles of air entering the smaller capillaries acted as emboli.

"Taking up the last theory first, we find, in the first place, there is no evidence whatever to prove that air may not be driven anywhere that blood can flow; and it is, to say the least, curious that any one should suppose that a bubble of air, which is compressible in itself, and capable of assuming any form under pressure, should form an impassable barrier against which a blood-pressure of 200 millimetres could press in vain—a pressure made up of blood, a virtually incompressible body. This seems to be sufficient evidence of the falsity of any such theory.

"Again, why should the air in the cavities of the heart prevent the valves from closing? We are accustomed to test the tightness of rubber bags by inflating them with air or water, and if the valves can close on a current of blood, why can they not do so upon a current of blood and air mixed? If the air was as heavy as mercury, and as difficult of propulsion, such a theory might stand.

"Even the theories of the causes of the supposed deaths in man do not, therefore, stand before a rigid examination, which is hardly to be wondered at when we have proved that the quantity of air entering the veins under such circumstances cannot be of any great quantity.

"According to Ashhurst and Agnew, the veins of the neck are the ones most liable to be entered by air, and it is said by Agnew that the frequency of this accident is due to the fact that the venous trunks in that region are in many places attached to the deep fascia, which prevents collapse of their walls when wounded; for this reason this part of the body is spoken of as the 'dangerous region,' according to Ashhurst.

"The explanation of the method by which the air finds entrance to the veins is supposed to be a process of suction produced by the expansile movements of the chest in inspiration. Practically, most surgeons will agree with me in stating that generally the blood pressure in the jugular vein is sufficient to cause so great a hæmorrhage as to prevent any air entering the vein; and I have proved the fallacy of the suction theory any number of times by leaving an open canula in the jugular vein, the vessel being tied above to prevent hæmorrhage."

Two dogs were then taken, and into the external jugular vein of one was injected twenty cubic centimetres of air, and into the jugular vein of the other forty cubic centimetres. The animals were subsequently released, and showed no apparent bad effects.

THE PRESIDENT: The Chairman of the Board of Directors wrote to a number of prominent surgeons asking them to take part in this discussion, but I think, without exception, they replied that they had had no experience with this accident. It has never happened to me to wound a large vein, and have any symptoms which would lead me to think that air had entered a vein. There are, however, a number of statements as to this matter which we must take as the statements of careful observers and operators. We must also bear in mind the important paper of Senn, of Milwaukee, presented at the meeting of the American Surgical Association, in 1885. His conclusions are somewhat at variance with the experiments of Dr. Hare.

I have always supposed, and taught in my surgical lectures, that the entrance of air into veins was a danger, and have explained it in this way: The air entering the vein and passing to the small vessels of the lungs, is churned into a froth, the little bubbles thus formed constitute aerial emboli, which have a considerable amount of adhesion to the blood-vessel walls. We can understand this by an ordinary observation on a summer's day. If we have a glass of cool water, we know that small bubbles of air accumulate at the sides of the glass in consequence of the heat, and these are often dislodged with some difficulty. I can, therefore, easily conceive how, in a blood-vessel of very small calibre, the bubble of air would form an aerial embolus which, adhering by its entire periphery, would not be displaced even by the two hundred millimetres of blood pressure. Several surgeons have had cases in which, as a fact, sudden death has occurred with a lapping or gurgling sound, apparently from the entrance of air, the patient rapidly becoming asphyxiated, and at the post-mortem there has been found frothy blood in the heart and pulmonary capillaries. It is hard to maintain that the entrance of air is not dangerous in the face of such observed facts. On the other hand, one is staggered when he sees twenty and forty cubic centimetres of air injected directly into the veins of a small dog, and he cannot conceive how this will have a different effect in different animals, except in so far as the blood pressure is different.

DR. A. J. DOWNES: From a few experiments on animals, for a different purpose, however, I have thought that there may be an apparent fallacy in these experiments. The danger from the entrance of air is an immediate one. When a

vein is wounded the on-flow of the blood-current, which is considerable in the jugulars, naturally carries air into the veins under different conditions than exist in the experiment. Here, owing to technical manipulations, the venous flow is at least passive. Then, too, nerve influence may be a potent factor. The suddenness of its entrance, not the quantity, of air may have some effect upon the heart ganglia.

DOMESTIC CORRESPONDENCE.

Some Ill Effects of Disinfection with Sulphur.

To the Editor:—In your editorial in THE JOURNAL of Feb. 8, 1890, entitled, "Correct Official Instructions as to Disinfection with Sulphur," you say: "there may possibly result from it some bleaching of colored articles . . . . . when the sulphur dioxide comes in contact with wetted goods and there may be some minor damage beside."

This statement is eminently correct, and while such damage is not considered as weighing against the disinfection, where necessary; it is well to know that sulphur burnt in the presence of moisture may have the following undesirable effects:

1. It injures the colors of many woolen goods, being especially hard on greens and bright reds—a red flannel shirt, for instance, always comes out yellow, sometimes the color is not affected; the dark blues are generally absolutely uninjured, but not rarely turned a reddish brown. The same color of course may be from very different dyes and thus give different results. The quality of the dye, as judged by the price of the fabric, is no criterion of how it will behave under sulphur. Clothes that have been worn are frequently discolored, when new ones, of the same nature, from the slop chest are but little or not at all affected, doubtless protected by the oil used in weaving, which has not worn off.

I have seen but few colored goods, other than woolens, submitted to SO_2, in some instances they were bleached.

2. Articles containing starch, if not washed soon, are corroded—especially true of handkerchiefs, etc., and the cloth covers of books.

3. Blankets and hair pillows—which are utterly unsuited to the process—will retain for about a week a smell so disagreeable, in no sense like that of burning sulphur, that they are unpleasant to use. This persists in spite of airing and exposure to the sun, but is immediately removed by washing, or heating in an oven.

4. Flour in ordinary barrels will not "rise" with yeast for some days after exposure, and this effect penetrates for a considerable distance in the barrel.

Tea is ruined permanently, as is ground coffee. The same charge is made of its effect on smoking tobacco, but not using it I can only give the testimony of others.

It is hardly worth while to mention the tarnishing of metal-work—all save gold—or the consequent injury to watches, clocks, etc. Oil prevents this almost entirely. Apples and other fruit become scalded and worthless.

The gas in the above observations was obtained by burning as much sulphur as possible in the presence of abundant moisture in a compartment more or less close, kept closed for from twenty-four to forty-eight and occasionally seventy-two hours. In general it was not possible to enter the compartment for some time—thirty minutes to an hour—after opening up. Where the apartment is more open less injury would be done and also less efficient disinfection.

I can say that these observations are sufficiently numerous to be reliable, and are what I have personally seen during actual disinfection.

If this note will enable any health officer to avoid a loss which he would otherwise cause, and presumably pay for, the purpose for which it is written will be fulfilled. Very truly,

H. R. CARTER, M.D.,
(U. S. Marine-Hospital Service.)
North Chandeleur Island, March 10, 1890.

NECROLOGY.

H. M. McKay, M.D.

Dr. H. M. McKay, of Woodstock, Ont., has died. He was formerly a President of the Medical Association of his Province, and at the time of his decease a member of the Ontario Board of Health. He was a representative man in the best sense of the word, and much sought after by reason of his natural powers and his excellent experience and judgment.

George T. Trezevant, M.D.

Dr. George T. Trezevant died at Abilene, Tex., on February 7, 1890, after an illness of ten days resulting from an attack of la grippe. Dr. Trezevant was born in 1846 in Hines Co., Miss., whence he removed in 1852 to Madison Parish, La. At the age of 16 he entered the Confederate Army, in which he served until the close of the war, when he began the study of medicine, graduating in New Orleans in 1869. Engaging at once in his profession at his home, he soon enjoyed a large and lucrative practice, but in 1875, being forced by ill health to leave his home, he decided to resume practice in Abilene, Tex., where he

soon became known as a popular and successful practitioner. As a physician he stood among the first; as a man he was bold and fearless in the discharge of his duty. He was indeed the true type of a Southern gentleman. While living in Louisiana he filled several offices of trust with honor to himself and to his parish. He was a member of the American Medical Association. An aged mother, a wife, four children and a brother, together with hosts of friends, mourn his loss.

BOOK REVIEWS.

THROUGH THE IVORY GATE. STUDIES IN PSYCHOLOGY AND HISTORY.—By WILLIAM W. IRELAND, M.D., Edinb.; formerly of H. M. Indian Army; Corres. Memb. of the Psychiatric Soc., St. Petersburg, and of the N. Y. Medico-Legal Soc.; author of "The Blot Upon the Brain." Pp. vii, 311. New York: G. P. Putnam's Sons. Edinburgh: Bell & Bradfute. 1889.

The title of this work has reference to the classical allusions of Homer and Virgil to spectres which walked through the ivory gate. It contains extremely interesting accounts of the lives of several famous and infamous persons, all of whom the author believes to have been the victims of "spectres." The individuals under consideration are Emanuel Swedenborg, William Blake, Louis II of Bavaria, Chas. J. Guiteau, Louis Riel, Gabriel Malagrida, and Thebaw, King of Burmah. The author's graphic descriptions of the character and lives of these insane persons, as he believes them to have been, furnish most interesting and valuable descriptions of some phases of insanity.

GYNECOLOGICAL ELECTRO-THERAPEUTICS. By HORATIO R. BIGELOW, M.D.; Permanent Member of the American Medical Association; Fellow of the British Gynecological Society; Member of the Anthropological and Biological Societies of Washington, D. C. With an introduction by Dr. Georges Apostoli. With illustrations. Philadelphia: J. B. Lippincott. 1889.

This book is an attempt to record what the author has seen and what others have done. His association with Dr. Apostoli has given the impetus which was necessary to inaugurate such a work. In speaking of his master, Apostoli, the author says: "His name will ever be indissolubly linked with gynecological electro-therapeutics. Many of the ablest men of to-day carry with them the delightful souvenirs of individual contact with one who was always courteous, obliging and honest; who is as free from the dross of life as a man can be, and whose extensive observation, patient investigation and research are sources of wonder. I have had the free use of his clinic, of his records, of his library and instruments, since October, 1888, and during the days of treatment in the Rue de Jour I have been in contact with medical men from all parts of the world. They know that whereof I write is true."

Dr. Bigelow speaks from a full experience. His first chapters are taken up with the fundamentals of electricity. His subsequent chapters are compilations from recognized authorities on his subject everywhere—Spencer Wells, Thomas and Skene Keith, Webb, Playfair, of England; of Mundé, Engleman, Grandin, Rockwell, Kimball, Massey, Laphorn Smith and Martin, of America.

Of the class of cases in which the electric treatment stands us in good stead the author specifies:

Fibroid tumors of the uterus.
Hypertrophy of the uterus.
Non-suppurative salpingitis.
Metritis.
Endometritis.
Subinvolution, superinvolution.
Disorders of menstruation.
Ovarian pain.
Chronic oöphoritis.
Periuterine inflammation.
Displacements.
Hæmatocele.
Some hystero-neuroses.
Stenosis of the cervical canal.
Erosions of the cervix.
Nausea of pregnancy.

The introduction to the work by Dr. Georges Apostoli is not the least interesting chapter of the work.

The book is well worth the perusal of mad operators.

ARTIFICIAL ANÆSTHESIA. A Manual of Anæsthetic Agents and their Employment in the Treatment of Disease. By LAURENCE TURNBULL, M.D., Ph.G., Aural Surgeon to Jefferson College Hospital, Philadelphia; late Honorary President of the Otological Sub-section of the British Medical Association, etc. With illustrations. Philadelphia: P. Blakiston, Son & Co. 1890.

The third edition of this valuable manual, revised and enlarged, is just issued from the publishing house of P. Blakiston, Son & Co. A thorough revision of his former work is here presented by the author. The various anæsthetics, local and general, are fully described, and the recorded observations of a large number of physicians experienced in their administration are embodied in the text. The indications for their use are fully described, the cautions to be observed in their administration are properly set forth, and the means to be used to prevent un-

toward results are explicitly stated. The closing chapter upon "The Medico-Legal Relations of Anæsthetics" will well repay the cost of the work.

WOOD'S MEDICAL AND SURGICAL MONOGRAPHS. Vol. 4. No. 1. October, 1889. Published Monthly, $10 a year; single copies, $1. New York: Wm. Wood & Co.

The October number contains short essays by John Brown, M.D., of Glasgow, on "The Influence of the Male Element upon the Female Organism," and by A. Symons Eccles, M.B., on "The Internal and External Temperature of the Human Body as modified by Muscle-Kneading." The remainder of the number is devoted to an extensive and valuable treatise by Thos. Bryant, F.R.C.S., on "The Diseases of the Breast." Mr. Bryant's work is well illustrated by engravings and excellent chromo-lithographs.

The Physician's Leisure Library. EDUCATION AND CULTURE AS RELATED TO THE HEALTH AND DISEASES OF WOMEN. By ALEX. J. C. SKENE, M.D. Detroit, Mich.: Geo. S. Davis, 1889. Pp. 127.

The writer informs us at the outset that "this work originated in a desire to answer a few of the many inquiries made by those who seek medical counsel regarding the care and education of the young." Dealing as it does with a medico-society subject and giving the author's reply to the oft repeated questions of his patients it will naturally find many if not most of its readers outside the medical profession. But to all readers, whether of the medical profession or not, we can warmly recommend this thoughtful and interesting book. We quite agree with Dr. Skene that such teachings as he inculcates cannot be expected and do not come with full force from other than medical men and women and, we may add, they are only useful when emanating from those who have grown wise from much observation and experience.

MISCELLANY.

LETTERS RECEIVED.

Dr. H. T. Rennolds, Baltimore, Md.; Dr. W. H. Wathen, Louisville, Ky.; Dr. Wm. G. Parrish, Burlington, N. J.; Thomas Cook & Son, New York; Dr. A. L. Hummel, Philadelphia; J. H. Chambers & Co., St. Louis, Mo.; Dr. F. E. Kerr, Chattanooga, Tenn,; Dr. S. L. Knapp, Mt. Vernon, Mo.; Dr. R. A. Lancaster, Gainesville, Fla.; Dr. Ephraim Cutter, New York; Dr. A. P. Clarke, Cambridge, Mass.; Dr. J. C. Mulhall, Cincinnati, O.; Dr. R. Stansbury Sutton, Pittsburg, Pa.; Thomas Leeming & Co., New York; Netherlands-American Steam Navigation Co., New York; Dr. F. A. Long, Madison, Neb.; T. E. McArdle, Washington; Free Press Printing Co., Mankato, Minn.; E. Merck, New York; Dr. David Streett, Baltimore, Md.; Dr. A. C. Lamothe Ramsay, St. Cloud, Minn.; Dr. M. A. Olive, Meridian, Tex.; Dr. H. A. Kelso, Paxton, Ill.; Dr. C. C. Hunt, Dixon, Ill.; Dr. J. B. Crowley, Sullivan, Ind.; Dr. P. W. Tomlinson, Wilmington, Del.; Dr. W. R. Townsend, New York; Dr. J. E. Charles, Chicago; Dr. E. A. Snepston, Emory, Tex.; Dr. J. W. Eldred, Chesaning, Mich.; Dr. Clara Marshall, Philadelphia; Dr. C. N. Pierce, Sec'y Woman's Med. College of Pennsylania, Philadelphia; Dr. M. R. Crain, Rutland, Vt.; Dr. J. H. Krause, Plumsteadville, Pa.; The Dixie Doctor, Atlanta, Ga.; Dr. J. W. Green, Shelbyville, Ind.; Dr. Richard J. Dunglison, Philadelphia; Dr. Paul Roach, Quaker St., N. Y.; Dr. J. H. Ludwig, La Porte, Ind.; E. B. Treat, New York; Dr. J. A. Webb, Providence, R. I.; Dr. J. E. Mears, Philadelphia; S. B. Hood, Sparta, Ill.; Dr. F. Glendenning, Lineville, Ia.; G. Mathey, New York; Dr. C. R. Early, Ridgeway, Pa.; Dr. F. H. Bosworth, New York; Dr. John C. Sundberg, San Francisco, Cal.; Dr. W. H. Allport, Dr. A. J. Coey, Chicago; Dr. J. McF. Gaston, Atlanta, Ga.; B. Glick, Kansas City, Mo.; Dr. G. B. Massey, Philadelphia; Dr. A. S. Hamlin, Marysville, Cal.; Dr. J. L. Sargeant, Lodi, Cal.; Dr. A. Clark, Stockton, Cal.; Dr. Thos. Legaré, Charleston, S. C.; Dr. E. M. Shaw, Edna, Tex.; Dr. N. S. Craig, Cedar Rapids, Ia.; Dr. J. H. Van Eman, Kansas City, Mo.; Geo. F. Lasher, Philadelphia; Duryea Jewelry Co., New York; Dr. H. K. Tefft, Topeka, Kan.; Parke, Davis & Co., Detroit, Mich.; Dr. J. B. Mattison, Brooklyn, N. Y.; Dr. James E. Wilson, Philadelphia; Dr. Charles F. Stillman, Chicago; Lea Bros. & Co., Philadelphia; W. P. Cleary, J. Movius & Sons, New York; John Wyeth & Bro., Philadelphia; J. Astier, Paris, France; Scoville & Adams Co., New York; Dr. Alfred C. Haven, Lake Forest, Ill.; Dr. Wm. B. Atkinson, Dr. Solis-Cohen, Philadelphia; Wm. S. Merrill Co., Cincinnati, O.

Official List of Changes in the Stations and Duties of Officers Serving in the Medical Department, U. S. Army, from March 22, 1890, to March 28, 1890.

First Lieut. N. S. Jarvis, Asst. Surgeon, is granted leave of absence for one month, with permission to apply for an extension of fifteen days. Par. 1, S. O. 34, Hdqrs. Dept. of the Missouri, Ft. Leavenworth, Kan., March 20, 1890.

By direction of the Secretary of War, authority is granted for the admission of Capt. Marcus E. Taylor, Asst. Surgeon, to the Army and Navy General Hospital, Hot Springs, Ark., for treatment therein. Par. 6, S. O., A. G. O., March 21, 1890.

Capt. M. E. Taylor, Asst. Surgeon, is granted leave of absence for one month, based on surgeon's certificate of disability, with permission to apply for an extension of one month. Par. 3, S. O. 26, Dept. of the Columbia, March 18, 1890.

Official List of Changes in the Medical Corps of the U. S. Navy for the Week Ending March 29, 1890.

P. A. Surgeon H. E. Ames, ordered to Museum of Hygiene, Washington, D. C.

Official List of Changes of Stations and Duties of Medical Officers of the U. S. Marine-Hospital Service, from March 3, 1890, to March 24, 1890.

Surgeon W. H. Long, leave of absence extended five days. March 11, 1890.

P. A. Surgeon S. C. Devan, to proceed to Erie, Pa., as inspector. March 12, 1890.

Asst. Surgeon F. C. Heath, to proceed to Cleveland, O., for temporary duty. March 18, 1890.

Asst. Surgeon W. G. Stimpson, commissioned Asst. Surgeon March 11, 1890. Assigned to temporary duty at New York, N. Y. March 13, 1890.